VOL. LVII JULY, 1920 NEW SERIES VOL. 10, No. 4

JOURNAL

of the

American Veterinary Medical Association

FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

CONTENTS

Editorial 387

Papers:

Parasitic Diseases in Their Relation to the Live-Stock Industry of the Southern United States—Brayton H. Ransom and Maurice C. Hall..... 394

Thoughts on Insects in Relation to Production of Live Stock and Poultry—F. C. Bishopp..... 414

Tick Eradication in the South—Ernest I. Smith..... 423

Baccharis Pteronioides as a Poisonous Plant of the Southwest—C. Dwight Marsh, A. B. Clawson and W. W. Eggleston..... 430

Better Live Stock—W. J. Butler..... 435

Tuberculosis Eradication: Its Aims, Methods and Ultimate Goal—John A. Kiernan..... 439

Studies on Anthelmintics. IX—Santonin—Maurice C. Hall..... 453

Some Changes in the Irregular Bones of Cattle—L. Enos Day..... 460

Some Observations in General Practice—H. E. Bender..... 463

Meat Inspection and Its Value as a Safeguard to the Public Health—R. W. Tuck..... 470

Clinical and Case Reports..... 477

Abstracts 482

Review 485

Army Veterinary Service..... 486

Association News:

American Veterinary Medical Association..... 489

Other Associations 496

Miscellaneous 502

THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. *Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue.* Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances should be addressed to JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, 1620 Hobart St., Washington, D. C. Matters pertaining to the American Veterinary Medical Association and membership should be sent to Dr. N. S. Mayo, Secretary, 4753 Ravenswood Avenue, Chicago, Illinois.

$3.00 per annum Foreign, $3.60; Canada, $3.25 Single Copies 30 cts. in U. S.

Entered as Second Class Matter, February 4, 1920, at the Post Office at Washington, D. C., under Act of March 3, 1879. Acceptance for mailing at special rate provided for in Section 1103, Act of October 3, 1917; authorized February 4, 1920.

JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

J. R. MOHLER, Editor, Washington, D. C.

VOL. LVII, N. S. VOL. 10 JULY, 1920 No. 4

THE INTERNATIONAL VETERINARY CONGRESS

IN order that our readers may have some idea of the views held by one of the leading French veterinary journals regarding the plans inaugurated at the recent New Orleans convention to invite the veterinarians of the world to this country for the next International Congress, we call attention to the following editorial which appeared in the January 15, 1920, number of the *Revue Générale de Médecine Vétérinaire*, which is self-explanatory:

"The grave question of the International Congress of Veterinary Medicine enters a new phase.

"The American Veterinary Medical Association, in session at New Orleans from the 17th to the 22d of November last, passed a motion toward having the next International Congress meet in the United States in 1921 or 1922. A committee composed of Drs. Merillat, Van Es, White, Mohler, Torrance, Cary and Eichhorn was appointed to get into communication with Dr. De Jong, Secretary General of the old Permanent Committee of the International Congresses, and with Sir Stewart Stockman, Secretary General of the interrupted Congress inaugurated at London August 2, 1914.

"Now the Conference of the Allied and Associated Academies, held at London in October, 1918, adopted the following resolutions:

" 'As soon as circumstances permit, the conventions relative to

international scientific associations will be, in accordance with the statutes or rules of each, denounced by the competent groups in the nations at war with the Central Empires. New associations considered useful to the progress of the sciences and their application will be established henceforth by the nations at war with the Central Empires, with the eventual concurrence of the neutrals.'

"The conferences of Paris (November, 1918) and Brussels (July, 1919) confirmed these decisions and prepared the new groups.

"There seems to be no doubt that the International Congress of Veterinary Medicine, with its international office at The Hague, must obey these directions if they do not wish to exclude themselves from the scientific world.

"The United States and Great Britain were represented in all these conferences; those countries have agreed to the rules formulated.

"Even admitting that the American Veterinary Medical Association is ignorant of these irrevocable decisions, its initiative is not explained.

"On the other hand, the consequences of it are easily discerned; the permanent office at The Hague would be continued in operation, and there would be a return to the pre-war situation; we are thus advised by the Scandinavian and Dutch scientists, with a pedantic incomprehension, to 'throw up the sponge.'

"We have always forbidden ourselves in this journal to indulge in loose invective and noisy excommunications; but we consider that the decisions of the Conference of London are binding upon our profession and its representatives.

"For us, the permanent office at The Hague is nonexistent. It is for the delegates of the Allied and Associated Nations to constitute a new grouping, which the neutrals may join or not.

"For us, the seat of the new permanent office should be at Brussels, the legal seat of the Council of Scientific Research.

"For us, the next Congress can not be held in the United States. It is proper that the Congress of London, interrupted by the German aggression, should be concluded at Brussels."

The subject of future international scientific relations was discussed also by Prof. Léon Guignard in his presidential address at the annual meeting of the French Academy of Sciences. He told of the Interallied Academic Conference held at Brussels which resulted in the definite founding of the International Council of Scientific Research, in which neutral nations were invited to collaborate, but from which the Germans and their allies were to be excluded until they had made "rightful reparation and the necessary guarantees." The results of the meeting at Brussels had scarcely become known, he said, when a group of members of certain academies in neutral countries filed a petition with the learned

societies of the Allied Nations asking them to resume pre-war relations with German scholars and scientists.

Professor Guignard, in the true spirit of science, recognized the fact that no scholar worthy of the name "should refuse to take an interest in any idea that may be promulgated throughout the world, no matter who the author may be, even though it should be his bitterest enemy"; but, he added, "he can take interest in it without coming into personal contact with the author."

This statement seems to represent the attitude of the French scientists.

THE VETERINARY PROFESSION AND THE PHARMACOPŒIA

THE great work of the decennial revision of the United States Pharmacopœia was put under way by the convention which met in Washington in May. The meeting decided certain general principles and intrusted the task of making the revision in detail to a committee of fifty, consisting of 17 medical and 33 pharmaceutical representatives. New officers and trustees were elected, Dr. Reid Hunt of Harvard University succeeding Dr. Harvey W. Wiley as President.

Although the veterinary profession as such has no representation in the pharmacopœial organization, it was represented incidentally in the convention by Drs. J. R. Mohler and R. W. Hickman, who were respectively a delegate and an alternate from the United States Department of Agriculture. During the week preceding the meeting the subject of the admission of the American Veterinary Medical Association to membership in the pharmacopœial body was taken up with several of the trustees, and while they expressed themselves as very favorably disposed toward the proposal, it was found that no action on it was possible at the meeting because of insufficient time and because the requirements of the constitution could not be met at once. To be entitled to representation an organization must have been incorporated for at least five years before the decennial meeting, while we have been incorporated less than that period. The belief was expressed that if the request were renewed in due time before the next decennial convention it would receive favorable consideration. Our profession is indeed fortunate in having staunch friends in the principal officers and on the Board of Trustees and Committee of Revision, who recognize the value of the work that has been done by veterinarians in toxi-

cology and in determining the physiological action of certain drugs.

In order that our Association may obtain representation in the next decennial convention, which will meet in 1930, we must conform to the requirements and see that formal application for membership is made in due time. This must be done not less than three months before the convention meets, and may be done earlier. This matter should be kept in mind particularly by the younger members of the profession and by those who are teaching materia medica and therapeutics in the veterinary colleges.

In the meantime, without waiting for formal admission to the next convention, a way is open for our Association to make recommendations to the present Committee of Revision. This can be accomplished by the appointment at our Columbus convention of a special Committee on Pharmacopœia, charged with the duty of taking up the subject in a systematic manner, preparing a list of drugs to be recommended for inclusion in the Pharmacopœia, and submitting it to the Committee of Revision.

In making up such a list it is advisable to propose only a few drugs and to select those against which no prejudice has arisen in their use by physicians. Several drugs which have almost dropped out of use among physicians are still used in a large way in veterinary practice. The following, for example, are suggested for consideration by the proposed committee: Areca nut; arecoline hydrobromide; barium chloride; lobeline sulphate; potassium arsenite. The reasons for asking for the inclusion of these articles are that they have therapeutic usefulness in veterinary practice, are largely used, are on the market without a standard for purity, and if included in the Pharmacopœia will be improved in quality by the manufacturers.

The Committee of Revision of the Pharmacopœia has a subcommittee on scope, of which Dr. H. C. Wood, of Philadelphia, is chairman. It would be well for the suggested committee from our Association to confer with Dr. Wood and thus bring to the attention of the Committee of Revision the requirements of veterinary practice and the advanced position of veterinary medicine. If this is wisely done it should also pave the way for the admission of delegates from the A. V. M. A. to the next Pharmacopœial Convention.

HANDICAPPING THE BUREAU OF ANIMAL INDUSTRY

AS passed by Congress the Agricultural Appropriation Bill for the coming year has reduced last year's appropriations by $1,281,235. As the lawmakers not infrequently do, they pruned the tree in the wrong place. Real economy is always desirable, but there is much dead wood and many parasitic growths on some of the other branches that certainly require more prompt and heroic treatment. Our legislators took the knife in hand and with a profound lack of discrimination cut right and left, in the process lopping off many branches already heavy with the promise of fruit.

Specifically the cuts were in these items:

From live-stock demonstration in areas freed of ticks	$50,000
From dairy work	10,950
From military horse breeding	16,940
From the investigation of animal diseases	14,400
From dourine eradication	20,000
From hog-cholera eradication	218,945
From foot-and-mouth disease insurance fund	950,000

The effects of these severe reductions in its available money must be serious, especially coming at a time when the dollar buys so much less and when to retain men in the service it is necessary to pay them better. The $50,000 devoted to showing the people in territory freed of cattle ticks how best to utilize their new conditions comprises the entire item, and the farmers of those regions must now be abandoned to their own devices. The cut in the dairy item will mean curtailment in the formation of cow-testing associations that have so successfully eliminated the worthless cows from the herds. It will mean also a reduction in the work of teaching the utilization of milk heretofore wasted by ignorant methods. Nearly half off the item for supplying the Army with the right sort of horses means a corresponding cut in that work, with the ruin of a system developed by eight years of studious planning. A more than 10 per cent cut in the investigative animal-disease work means a slowing down all along the line in an activity in the achievements of which the Bureau may indulge in pardonable pride. Dourine eradication will also proceed more slowly, and the demands cannot be met.

If there be any branch of the tree that needs no pruning, it is that of the hog-cholera work. It is one that has borne fruit and that is yet in the full vigor of health and promise. When seven years ago the Bureau began the fight against hog cholera, 118 hogs in each

thousand died of cholera. Losses from cholera are now but 38 hogs to the thousand—an actual saving of $40,000,000 a year based on the production of last year. In 35 States the Bureau has built up efficiently functioning machinery of coöperation with State officials. With 140 field men it has been producing splendid results. But with the heavy cut in money the work will receive a most serious check. Only about 54 men can be carried, several States must be abandoned, and forces reduced in all the rest; and once the sensitive machinery of coöperation is stopped, it becomes junk. It may be predicted with safety that several times the amount of the reduction in the appropriation will have to be spent to build up another such efficient system.

Besides these ill-considered prunings, Congress took away all but $50,000 of the insurance against foot-and-mouth disease. Since the great outbreak of 1914-1915, successive Congresses have given authority to expend $1,000,000 in fighting this destructive malady should it again appear. Not a cent of this has ever been drawn from the Treasury, and would not have been, except to protect the country from the frightful losses of foot-and-mouth. Consequently, while this reduction of $950,000 looks like a saving of money, yet it is not, and if while Congress is not in session the disease should creep into the country by any one of thousands of obscure avenues, the day that the legislators took away this insurance will have been a costly one for the live-stock industry of the nation.

To be fair some note should be made of the increases which Congress allowed. The funds for looking after the inspection and testing of animals for export were raised by the munificent sum of $2,000 and the great meat-inspection work was given an increase of $24,300. Also, without increasing the amount actually appropriated, Congress made available for operating expenses $300,000 more of the tuberculosis eradication money. This item amounts to $1,500,000. Heretofore, only $500,000 could be used for operating expenses. Next year $800,000 will be available for this purpose, the remaining $700,000 to be used for indemnities.

Notwithstanding these various reductions it is understood that the Bureau contemplates recommending a series of promotions involving nearly half a million dollars. This is to be made possible by economies which are to be effected by consolidating some of the field offices and forces and combining and enlarging the duties of certain positions, thus bringing about a more compact and intensive organization and a reduction in some of the overhead and other

expenses. A way will thus be found to reward in some measure the faithful, efficient and loyal employees who have stood by the Bureau despite the temptation of greater remuneration on the outside.

TRANSFER OF THE VETERINARY CORPS

IN an editorial which recently appeared in *The Rider and Driver* the statement is made that the propaganda they started last December to bring about a separation of the Remount Service from the Quartermaster Corps has met with general approval. One high-ranking officer of the Remount Service expressed his approbation of the sentiment regarding a separation by suggesting that it would probably be better not to ask for a complete severance, but rather "to have the Remount Service 'a corps within a corps' as the Veterinary Corps is a corps within the Medical Department." Strange to say, the editorial further states that "a veterinarian has nothing to do with the health of persons and it is therefore difficult to see why he should be under the jurisdiction of the Surgeon General, unless it be for reasons of political policy." The veterinary officer's activities in meat inspection and milk inspection as the protector of the health of the personnel of the Army are evidently unknown or not properly understood. Furthermore, it is suggested as a matter of propriety that the Veterinary Corps, as well as all animals and all animal-drawn transportation, should be a part of the Remount Service. The request is made to harmonize the various diverse opinions and unite to attain that end. Views which we have received from a number of the members of the Veterinary Corps are decidedly in opposition to the views expressed in *The Rider and Driver*.

The Canadian Veterinary Record has entered the field of veterinary journalism. It is issued from the Ontario Veterinary College at Toronto and claims the distinction of being the only veterinary journal published in Canada. The initial number, for April, 1920, is modest in size but of good appearance and contains a good variety of material. Only two issues are contemplated for this year, but if these meet with sufficient favor it is the purpose to issue the journal quarterly thereafter. The subscription price is but $1 a year. We congratulate our Canadian colleagues on their enterprise and extend our best wishes for success.

PARASITIC DISEASES IN THEIR RELATION TO THE LIVE-STOCK INDUSTRY OF THE SOUTHERN UNITED STATES[1]

By BRAYTON H. RANSOM *and* MAURICE C. HALL, *Washington, D. C.*

GENERAL CONSIDERATIONS

THE present indications are that the cattle tick will soon be eradicated from the United States, possibly within a very few years, thereby bringing to a close a campaign of extermination against this pest which has already lasted over 12 years. This campaign has been an epic in the history of American veterinary medicine. Now that the end of the campaign is in view, it is not amiss to cite those who have coöperated in the campaign, for distinguished service, especially the field service of the Bureau of Animal Industry and the veterinarians of the South, and to congratulate the live-stock industry of the South on the pending total destruction of the tick and its works within its borders, not under an armistice, but on terms of annihilation for the tick.

But with the eradication of the tick and the increase in the live stock of the South, made possible by tick eradication, it will undoubtedly develop that a great task has been completed only to uncover tasks in the control of other parasitic diseases of but little less importance. For the same climatic conditions of warmth and moisture that made the cattle tick a thriving pest are favorable in varying degree to other parasites, and with an increasing number of cattle, sheep and swine there will come increasing infestations because of larger numbers and closer pasturing in a warm, moist country. As a matter of fact the time is already at hand when serious attention must be given to the question of the internal parasites of live stock in the South, if much of the benefit of tick eradication is not to be lost. There have been instances in various localities in which live-stock projects confidently undertaken following tick eradication have almost at the outset sustained losses from parasites.

In warm countries wherever there is an abundant rainfall the diseases caused by animal parasites that may be only annoying or occasionally troublesome in cooler climates assume an immense importance. One of the great problems that must be solved before

[1] Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

such countries can reach the highest plane of development is the problem of eradicating or controlling parasitic diseases, not only those affecting human beings directly but also those affecting live stock. These diseases in the past have been among the fundamental factors that have influenced the course of history, and the future of civilization in the warmer regions of the earth is likewise dependent in no small degree upon the extent to which man succeeds in controlling his parasites and those of his stock. In the past he has for the most part blindly adjusted himself to the limitations imposed by them. In the future, however, with a constantly increasing store of knowledge gained from experience, and particularly from scientific investigation, he will gradually become able to maintain himself and his flocks in prosperity under climatic conditions that formerly permitted only a meager existence.

Heretofore the presence of the tick in the Southern United States has stood solidly in the way of a prosperous cattle industry and has prohibited a highly developed agriculture. Now the tick is rapidly disappearing from the South and will undoubtedly soon be completely exterminated within the borders of the United States. Already, therefore, we have before us an example of a profound modification in the course of development of agriculture over a vast area, brought about by the conscious control of a destructive animal parasite. That southern agriculture has been fundamentally affected by tick eradication and will be increasingly modified by this fact hereafter is unquestionable. Whether, however, the live-stock industry in the South as a whole can be brought to a high degree of development as it is understood in more northern latitudes is as yet problematical. The easy optimism of those who assume that with the conquering of the tick an intensive system of animal husbandry can be established upon a basis of the methods followed in cooler climates is not shared by those familiar with the facts concerning animal parasites.

The eradication of the cattle tick is only the beginning of the campaign of suppressing the parasites which must be suppressed in the South before the numbers of live stock can be greatly increased. It is true that tick eradication renders possible a live-stock industry on a scale formerly impossible, but the presence of other parasites potentially and actually as destructive as the tick constitutes a menace under which the industry can not thrive and which if disregarded will surely and seriously impede the development of southern agriculture. Unlike the tick, these other parasites are mostly not peculiar to the South but range far to the northward.

As a rule, however, in the North they do not limit the production of live stock greatly below the number that may be supported by the quantity of readily available feedstuffs. In the South, on the other hand, the capacity of the soil in the production of food for animals can be utilized only to a very slight extent, notwithstanding the eradication of the tick, unless measures are taken to eradicate or control other parasites as well.

Formerly, because of relatively small numbers of live stock and because of their generally small value, the damage done by parasites or the damage they are capable of doing under southern climatic conditions attracted comparatively little attention, and the veterinarian has commonly neglected the subject of parasitology. Now, however, an emergency has arisen, in the face of which the question of animal parasites in the Southern United States must be given serious consideration by the veterinary profession and by all others interested in the welfare of the live-stock industry. If it is to live up to its previous excellent record of achievement in the fields of research and practical accomplishment, the veterinary profession of this country must lose no time in preparing to meet the demands that will be made—in fact, that are even now being made—for protection against the inroads of animal parasites upon the southern live-stock industry. Already following tick eradication in many sections of the South evidences of serious trouble from parasitic diseases among augmented herds and flocks are becoming apparent. This condition must be met with effective measures of relief, or much of the potential benefit of tick eradication will be lost. Furthermore, it is important that these relief measures be promptly forthcoming if a severe setback in the movement for more and better live stock in the South is to be avoided. Losses that occur occasionally in an established industry are commonly accepted with equanimity, but the discouragement that follows losses, especially serious losses, when one has just undertaken a new enterprise, is apt to drive beginners out of the field and give the undertaking a reputation that will not soon be lived down.

Unfortunately, because of our lack of knowledge concerning methods of controlling many of the parasites of live stock, and because of the lack of means for putting into effect the knowledge already available, it is not likely that much headway will be made in the immediate future toward a practical solution of the parasite problem in the South. Therefore it must be anticipated as a matter of course that many of the ambitious plans for a rapid and extreme development of the live-stock industry in southern localities will

come to grief. It is the duty of the veterinarian to endeavor to restrain over-enthusiasm among his clients and to caution them against a careless optimism that may tempt them to go beyond the yet poorly defined limits of safety in the management of live stock in the South. As already mentioned, disaster may come at the very outset, but even though the first few years may be marked by no serious trouble from parasitic disease, this experience can not be taken as a criterion by which to judge the future. It frequently happens, as many have learned to their sorrow, that when live stock in considerable numbers are introduced into an area formerly free from live stock, or only sparsely stocked, the animals flourish for a time, but sooner or later, if the climatic conditions are favorable for the propagation of parasites, the early profits of the owner are swept away by parasitic diseases. At first the parasites brought in by the new stock or already present in the native stock are too few in number to cause any material damage, and only as they become more numerous with the lapse of time does the havoc begin.

It is proper that the live-stock industry should be encouraged in the South, but the tendency to plunge ahead along the lines established by experience in northern climates should be restrained and caution advocated.

Much investigational work must be done before it will be possible to outline comprehensive methods of managing live stock under southern conditions so as to avoid serious damage by internal parasites, but there are general rules of prophylaxis against these pests whose observance by the live-stock owner will help materially to prevent losses from parasitic diseases. Most veterinarians are familiar with these rules, but some of them may well be repeated here.

A large margin should be maintained between the number of live stock actually placed on a given area and the number that area will apparently support judged by northern standards. Provision should be made for frequent movement to fresh grazing lands, the use of permanent pastures should be minimized, cultivated forage fields utilized as much as possible, and low-lying, swampy areas avoided. Because the parasites of horses, of swine, and of ruminants are in general not intertransmissible, these three kinds of animals may be grazed in turn upon the same fields with little risk of serious spread of parasitic diseases from one kind to another. Because the dog is a necessary agent in the spread of a considerable number of more or less dangerous parasites of live stock, as well as of certain parasites of man, the welfare of the live-stock industry and human welfare in the South as elsewhere demands the suppression of the

wandering dog. Live stock known to be seriously parasitized should not be pastured with others, but generally it is useless to attempt to prevent the introduction of internal parasites. If not already present, parasites of various kinds are almost certain to be introduced irrespective of any practically possible precautions that may be taken. Hence, the live-stock industry amid surroundings favorable to parasites must be conducted under the assumption that the parasites are always present and liable to cause great damage if given an opportunity. This opportunity may come with an unusually wet season or through failure of the live-stock owner to observe the precautions necessary for the control of parasites under prevailing local conditions.

In the development of special methods for the control of internal parasites, including methods of destroying them by medicinal treatment, considerable progress has been made in the case of some of the common parasites in the South, and these methods, supplementing general preventive measures, such as those that have been outlined, will often prove useful in reducing losses from parasitic diseases. For example, the bare-lot method devised by Dalrymple is highly effective in preventing the infection of lambs with nodular worms, and the copper-sulphate treatment is remarkably successful in destroying stomach worms. In the case of a number of other important parasites we also know of special preventive measures and methods of treatment, but our knowledge is on the whole extremely inadequate for meeting effectively the practical needs of the live-stock owner. Therefore, to best serve the interests of the southern live-stock industry, the veterinarian must not only secure the widest possible application of what little knowledge we have of controlling parasitic diseases, but he must do all that he can to promote research work on these diseases in the South.

The various Southern States could well afford to establish within their borders special laboratories and field stations for carrying on such research work in actual contact with local conditions. The establishment of several such laboratories in the South is important, not only because more rapid progress can be made toward a solution of the problem of controlling parasites by multiplying the number of investigators working on the problem, but also because the problem is bound to vary considerably in different localities, and hence to secure the best results investigations should be carried on in different places. Because it is specially important at the present time that as rapid progress as possible be made in the development of methods of controlling parasitic diseases in the

South, it seems highly desirable to organize the work so that it may go forward simultaneously in a number of localities. In view of the lack of qualified investigators in this field, it will not be possible to inaugurate the work on as large a scale, perhaps, as that we have indicated, even if all the States concerned were willing to go ahead with it; but we believe that if the work should be started in one or two States the benefits would soon become so apparent that it would be quickly taken up in other States, and that meanwhile with the demand for workers in parasitology a sufficient number of young men with a leaning toward research work would prepare themselves as parasitologists to become available as needed. Notwithstanding the capable work in parasitology of such men as Dalrymple, Francis, Cary, Dawson, and others, the subject has scarcely been touched in the South. Because the attention of these men has had to be devoted for the most part to other pressing questions in veterinary medicine, the work they have done in parasitology has necessarily been incidental and fragmentary. There is thus awaiting the investigator a fertile field for research in parasitology in the South. It is a fascinating field for the investigator, both from the purely scientific standpoint and from the standpoint of the immediate practical importance of the results to be obtained. We trust that the next few years will bring into this field a rapidly increasing number of capable, energetic workers, and we are confident in the light of the past history of scientific research that the results of their work can not fail to be of vast benefit to the southern live-stock industry.

SPECIFIC PARASITIC DISEASES

As an indication of what the South will have to contend with in the way of parasitic diseases, we are calling attention, in the following discussion, to some of the more important parasites.

Stomach Worms

Of the parasites that may be confidently expected to take toll of animals in the South, the stomach worm of sheep and cattle is one of the most important. So far as the South has already built up a live-stock industry in sheep and cattle, it has learned of the danger from this worm and has already suffered quite generally from it. With the advent of more cattle and sheep, this parasite will do more damage and require more attention from the veterinarian. It will be necessary to treat animals for this disease and to advise owners with reference to prophylaxis. On both of these points we are rather well supplied with information as to effective measures.

The copper-sulphate treatment has been found satisfactory in killing the stomach worm. In passing, however, it should be said that practically all anthelmintics are poisonous, intended to poison the worms, but incidentally poisoning the host to a limited extent. It is always advisable to use copper sulphate as early in the progress of the disease as possible, in order that the animal treated may still have the strength to tolerate the treatment and reap the benefit of the subsequent freedom from stomach worms. To wait until an animal is in an advanced stage of the disease is to await the alternative of allowing the animal to die of stomach worm or of risking a treatment that may hasten the death of an animal too greatly weakened to tolerate treatment.

Prophylaxis in this disease, as in many other nematode infestations where there is a direct life history, is built up about the fact that the eggs which will ultimately convey the disease are passed in the manure and so infect the pasture. The eggs will hatch and the resultant embryos will develop to infective larvæ in a period of time which will depend on the temperature and moisture conditions. These conditions are very favorable throughout the greater part of the South for a considerable part of the year, and the period of development of the worms will therefore be correspondingly short. Pasture rotations will have to be practiced at comparatively short intervals to be effective. It has been found that embryos will hatch and develop to infective larvæ in ten days or less under favorable conditions, and conditions favorable enough for this prevail quite generally in the South. With the abundant stand of grass in the South, a given number of sheep can be pastured on a smaller area than in the more arid plains of the West, and it should be possible to fence smaller areas in a pasture-rotation system.

Nodular Worms

The nodular worms of sheep, cattle and swine are of special interest to the southern practitioner as a result of their frequency in southern live stock. Furthermore, we are indebted to the South for some of our best studies of nodular disease, the bare-lot method of Dalrymple being one of the most interesting of the control measures used in connection with nodular worm in sheep. Nodular worms are well known, but the exact details of their life history have never received adequate attention and the investigator in the South can find here a profitable field for work. The practitioner will find it a disease that is spreading and increasing in extent and importance in the United States. It is a disease for which we have

as yet no demonstrably adequate means of treatment, and here is an opportunity for work by the practitioner and the laboratory man. Experimentally, gasoline, in doses up to an ounce, has been found to remove about 16 per cent of the adult nodular worms, but this is not a satisfactory showing and gasoline has several objectionable features.

Hookworms

Another group of parasites that have received some attention in the past and will need more in the future are the hookworms of sheep, cattle and dogs. The clinical aspects of hookworm disease in man and in dogs are already familiar to you. You know the train of consequences that follows the persistent loss of blood from the numerous small hemorrhages due to hookworms—the anemia, the edema, and dropsical conditions resulting from the impoverishment of the blood, the ultimate weakness and emaciation resulting from heavy infestations, the retardation of growth and development, the diminished resistance to other diseases, and the occasional deaths, sometimes so numerous in the case of dogs that breeding kennels in some places have become unprofitable.

Infestations with similar worms, having the same blood-sucking habit, in the intestines of sheep and cattle must produce substantially the same results. Hookworms are sometimes very numerous in sheep and cattle (we have seen thousands in one animal), and the hookworm disease of cattle has been reported from the South under the name of "salt-sick" as a troublesome disease. These parasites have probably received too little attention in this country and deserve further investigation.

Hookworms are difficult to remove from man and dogs, though oil of chenopodium and combinations of this and chloroform, properly used, may be successfully used in combating them. In sheep and cattle the presence of the complicated ruminant stomach adds to the difficulty of treatment for hookworms, and much additional work on this subject is desirable. As regards prophylaxis, the measures which are of value in the case of the stomach worm are of value in hookworm disease, but in addition one must bear in mind the possibility apparent by analogy from what is known concerning the hookworms of man and of the dog, that these parasites may enter their hosts through the skin, so that even driving animals through infected sand or mud may result in infection. It is therefore not impossible if animals are driven daily through an infected pasture that a heavy infection, equal to one obtainable by pasturing on infected pasture, may be acquired.

Lungworms

Lungworms constitute another serious pest of cattle, sheep and swine. The apparently most dependable work by foreign and American parasitologists to date all points to the conclusion that the lungworms have a simple life history, in spite of the contentions to the contrary of those who have claimed the need for an intermediate host or the alternation of a free-living stage with the parasitic stage. Lungworm embryos leave the lungs by way of the trachea and get onto the pasture in the saliva or in the feces. Arriving there they may develop to infective larvæ in the case of some species in the course of a few days, ten days or less.

There have been numerous treatments used in lungworm disease—fumigation with various gases, intratracheal injections of substances intended to kill the worms, and the injection of such substances up the nostrils. In general these treatments have an element of danger in them and proof of efficacy in killing worms is usually lacking. A treatment, however, which seems worthy of trial on the grounds that it is simple, comparatively safe, and apparently of value in improving the condition of the animals treated, is the one recommended by Herms and Freeborn. They recommend the injection of chloroform into the nostrils with a medicine dropper, giving sheep 3 mils, swine 5 mils, and calves 11 mils. The nostrils are closed with the fingers until the animal is groggy. The treatment is repeated once or twice at five-day intervals if necessary. It is recommended that Epsom or Glauber's salt be administered two hours after treatment. Nursing treatment is also advisable. The animals should be put on safe pasture or put up and well fed, with a view to building up their resistance and tiding them over the danger until the worms die.

Ascarids

Another group of worms which are of importance in the South are the ascarids or maw worms. These worms are of more importance as intestinal parasites of swine, horses and dogs than of cattle and sheep, but in some cases at least ascarids as larval forms in the lungs may do considerable injury even where they do not complete their development and appear as mature worms in the intestine. Comparatively recent work has shown that the former concept of the life history of the ascarids was incorrect in some respects.

It has been generally supposed until recently that ascarid eggs were passed in the feces and an infective embryo developed in the egg, and that when these eggs were swallowed by suitable host

animals the embryo was released in the digestive tract and there developed to the adult worm. It is now known that when such infective eggs are swallowed by a suitable host the embryos after hatching in the intestine make their way to the lungs, probably in the blood stream, and reach a certain stage of development in the air passages of the lungs. They then ascend the trachea and are swallowed, subsequently, if the infested animal be a suitable host, becoming mature in the intestine. It has also been found that when ascarid eggs are swallowed by some animal other than the normal host, as when the eggs of the swine ascarid are swallowed by the rat, the embryos will escape and travel to the lungs, undergoing development to a point where they will ascend the trachea and descend the esophagus. Further development, however, does not take place, and the larvæ are passed out of the body in the feces.

It seems quite likely that there is no distinct ascarid of the sheep, as ascarids are apparently too rare in sheep to keep the species in existence if they depend entirely or principally on this host. It is practically certain that these worms are swine ascarids in an unusual host. Ascarids seem poorly adapted to life in sheep and are usually immature forms, smaller than the swine ascarid. It seems likely that sheep must swallow infective ascarid eggs quite frequently, that the embryos may commonly travel to the lungs, and that very few of the resultant larvæ ever develop in the intestine. If this supposition is correct, we may sometimes find cases of verminous infection of the lungs in sheep caused by young ascarids. This has been found to be the case in swine. Lung troubles in young pigs have long been a source of perplexity to the men interested in hog cholera and swine plague. The compilations of these two diseases that make such a polymorphic picture have additional complications in the form of lung lesions that were difficult to place with either disease. These lesions, characteristically bright-red hemorrhagic points, have been found experimentally and in the field to be due to larval ascarids, capable in heavy infections of killing animals.

Another interesting phase of this matter is the fact that these larval worms have been found to be associated with the complex of symptoms known as "thumps." The explanation commonly given as to the cause of "thumps" has been that it was due to a reflex action of the diaphragmatic and cardiac nerves from a stimulus originating in the digestive tract, the reflex being readily aroused when animals were exercised or excited, especially when the stomach was full. It was noted that pigs with the "thumps" lost flesh,

became stunted, and had poor appetites. Turning animals out to pasture has been found beneficial. Present indications are that the disease is often associated with ascarid infection, the worms being responsible for the poor condition and lack of growth as well as for the pulmonary symptoms. Improvement when turned out to pasture is perhaps due to removal from continuous infection in pens abundantly infested with eggs.

While much more work must be done along this line, it is safe to say that the question which has been so often raised by veterinarians and parasitologists in the past, as to whether ascarids, after all, do much damage, can be confidently answered in the affirmative. There is very positive evidence already in hand showing the demonstrable damage sustained by animals as a result of the invasion of the lungs by ascarid larvæ, and a growing weight of evidence indicating that young animals that become heavily infested with ascarids suffer a serious set-back in growth and development. Such facts are of especial interest to the southern veterinarian, as ascarids flourish in the tropical or at least semi-tropical conditions present in a large portion of the South.

Fortunately we have satisfactory treatments for ascariasis. It may be successfully treated in the dog with American wormseed oil, the product of a plant common in the South, in doses of 0.1 mil per kilo with an ounce of castor oil, and in swine in doses of 4 mils per hundred pounds of live weight with 2 to 4 ounces of castor oil. It may be successfully treated in the horse with carbon bisulphid in 6-dram doses, two 4-dram doses at a 2-hour interval, or in three 3-dram doses at hour intervals. Ascarids are too rare in the intestines of sheep and cattle to require treatment. Prophylaxis is a matter of sanitation, of clean stables and clean pens, clean food and clean water, and of pasture rotation where necessary.

Strongyles

Of the nematodes that are important parasites of the horse, the numerous strongyles take first rank on account of their general occurrence and the fact that they occur quite commonly in large numbers. These worms belong to the genera *Strongylus, Triodontophorus, Gyalocephalus* and *Cylicostomum,* and mixed infestations with these worms give rise to a general clinical picture which has been termed strongylidosis, a picture which is complicated in individual cases by certain features characteristic of individual species of worms. The general picture is one of an afebrile condition, with an unthrifty animal, as indicated by a rough coat and poor

condition, and by disturbances of digestion, such as diarrhea or constipation. The picture is one of parasitism in general. It is apt to be associated with anemia, as a result of the blood-sucking habits of such worms as *Strongylus*, a condition which in turn is naturally associated with edema and ascites. Further complications of a very definite sort are furnished by the larvæ and agamic forms of the species *Strongylus vulgaris*.

So far as we know at present, all of these strongyles have a direct life history, the eggs in the manure undergoing a development that gives rise to an infective larval stage on pasture. But when these larvæ are ingested by members of the horse family, they take different routes in the body and undergo somewhat different lines of development, depending on the species involved. Apparently the larvæ of *Strongylus vulgaris* make their way to the posterior mesenteric artery, as a rule, though other branches from the abdominal portion of the aorta may be involved. Here the worms set up an endarteritis, with a resultant fibrinous deposit, the inflammation presently involving all the arterial tunics and giving rise to a thickening which is most pronounced in the middle coat. The diseased and weakened arterial walls dilate and the result is the formation of an aneurism, in which the strongyle may be found free or more or less entangled in the layers of associated thrombus or in the walls of the artery.

The potential danger from these aneurisms is well known to the veterinarian. They may rupture, in which case the animal dies from internal hemorrhage. Parts of the thrombus may detach and be swept away in the blood stream to become an embolus at some point. When these emboli are carried along the course of the posterior mesenteric artery, they quite commonly give rise to verminous colic by obstructing the blood supply to a limited portion of the intestine and thereby causing a cessation of peristalsis, with a condition of limited intestinal stasis in which the contents of the involved portion of intestine undergo fermentation, the intestine becoming distended with gas and the animal showing evidence of colic. Reflexes to the uninvolved adjacent portions of the intestine may cause violent peristalsis with an accompanying likelihood of intussusception or volvulus at the union of the intestine which has a normal blood supply with that from which the supply is shut off. Occasionally the gas formation will cause a rupture of the intestine, stomach or diaphragm. Sometimes the colic will clear up spontaneously by the formation of a collateral blood supply or the

absorption of the embolus, but occasional animals will die as the result of the plugging of the main branch of an artery or too great delay in restoring circulation to the damaged part, the involved intestine becoming gangrenous. Emboli which pass to the circulation of the hind legs give rise to an intermittent lameness of an annoying type, not capable of radical and permanent cure. In the course of time the agamic worms will leave these aneurisms and pass into the lumen of the intestine, where they become mature, but the aneurism persists with its constant threat to the life and health of the animal. Even aside from embolus production, such aneurisms interfere with the blood supply, nutrition and tone of the large intestine, and are probably related to the common occurrence of colic in the horse, the only domestic animal commonly afflicted with aneurisms.

On postmortem examination there are a number of striking lesions that are readily found. The mucosa of the cecum and double colon quite commonly presents numerous petechial hemorrhages as a result of the attacks of the worms belonging to the genus *Strongylus*, *S. equinus*, *S. edentatus*, and *S. vulgaris*, and these worms are quite commonly found attached to the mucosa, though some are found free, usually near the mucosa rather than deep in the ingesta in the intestinal lumen. In a paper by Ransom and Hadwen attention has been called to the fact that ulcers found in the posterior loop of the colon are due to *Triodontophorus tenuicollis*, the worms being commonly found attached in clusters to these ulcers. What is evidently the same condition has been noted and figured by Hartman, although he did not determine which species of worm was responsible for the ulcers. Numerous small worms of microscopic size may be found in the mucosa, worms belonging to the genus *Cylicostomum*, and cysts in the wall of the large intestine occasionally contain agamic forms of *S. vulgaris*, presumably returning to the intestine to complete their development. Larval and agamic forms of *Strongylus* may be found in various places, *S. equinus* showing a preference for the liver, lungs and pancreas, and *S. edentatus* occurring in various places under the pleura and peritoneum, in the hepatic ligament, the perirenal connective tissue, the muscles of the forearm, and even, perhaps, in the aorta. The last-named species has a predilection for occurring in the cryptorchid testis and has been found there in numerous cases, though frequently reported under other names.

Although strongylidosis is so common in horses the world over

that the evil effects produced are usually discounted, there is evidently a growing disposition to take this condition into consideration where horses are obviously sick or unfit but do not show a febrile temperature. So formidable an array of blood-sucking worms, such persistent invasion of the tissues, with the migrations of such large worms into such important structures as the blood vessels, can hardly be regarded as a minor matter or as something to be disregarded.

Fortunately, this disease appears to be amenable to treatment to an extent that would at first sight hardly seem likely. The available experimental evidence indicates that the strongyles of the large intestine may be very readily removed by fasting an animal for 36 hours and administering 16 to 20 mils (4 to 5 drams) of oil of American wormseed, immediately preceded or followed by a quart of linseed oil. Fairly good results may be obtained by the substitution of 2 ounces of turpentine for the wormseed oil. For horses that are on pasture it would probably be advisable to administer such treatment twice a year, since it is certain that the animals will almost always be more or less heavily infested. In keeping with the general truth that young animals suffer most from parasites, the treatment of young animals for the removal of such worms would probably be a measure of value in keeping down infestation and protecting the animal from such serious handicaps as verminous aneurisms. These young animals deserve the greatest possible amount of consideration in the selection of pastures and water supplies to insure freedom from infestation with these worms.

A comparison of the degree of strongyle infestation in horses in Michigan and in Virginia indicates that infestations are much greater as a rule in the Virginia horse, which is what would naturally be expected from the difference in temperature, the rainfall and the moisture factor near Detroit and that near Washington being very nearly the same. It is likely that horses throughout the South will show a greater number of these worms on an average than those of the North, and this likelihood suggests that the veterinarian in the South will be repaid for more than the customary attention to these parasites.

Habronema

Another group of nematode parasites of the horse which have been found of late years to be important are the species of the genus *Habronema*. These worms occur in the stomach of the horse

as adults, and in the skin and such modifications of the skin as the conjunctiva as larvæ. In the stomach one species, *H. megastoma*, is especially injurious in that it produces nodules or tumors that may attain the size of a hen's egg. The worms may be seen projecting from small apertures at the summit of the tumors. The tumors become invaded by bacteria and put out of commission as secreting and absorbing surface areas of the stomach that may be of considerable extent in some cases. Where the tumors are near the pylorus, they may interfere with the passage of food either mechanically or by irritation of the pyloric region and the production of spastic reflexes. The same worms cause abscesses in the spleen. There is said to be a considerable mortality from this worm in Australia.

It has been found that the worms present in the disease known rather generally as summer sores and locally under a wide variety of names are larval worms of the genus *Habronema*. In this disease, sores form along the ventral or lower portions of the body, and the diseased skin becomes very thick. The sores are persistent as indolent ulcerations through the warm months, but have a tendency to disappear in cold weather. Sores of a similar nature are found on the eyes, causing the disease recently named habronemic conjunctivitis.

It was ascertained in the Bureau of Animal Industry that a larval worm which had been described many years ago from the common house fly was the young form of a species of *Habronema*, *H. muscae*.

The life histories of other species have since been investigated in Australia and it has been ascertained that *H. megastoma* also has its intermediate stages in the house fly, but that *H. microstoma*, although capable of developing in the house fly, usually develops in the stable fly, *Stomoxys irritans*. Following the initial work here on the life history of *Habronema*, workers elsewhere ascertained that the worms long known to be present in summer sores were *Habronema*, which immediately gave a clue as to the mode of production of the disease. The eggs produced by the female *Habronema* pass out in the manure and are naturally ingested by fly maggots as they feed and breed in the manure. In the maggot and in the resulting fly, the worms develop to an infective larva, which is situated in the head usually, the thorax occasionally, and in the abdomen rarely. Infected flies are swallowed by horses in feeding and in drinking, especially when benumbed flies fall into feed boxes, mangers, and drinking troughs while the temperatures are low in the early morning. The larvæ from such flies apparently escape

in the stomach of the horse and continue their normal development. There is also the possibility of the larvæ escaping from the proboscis of flies as the flies feed on the moisture on the lips of horses. But the worms found in the skin of horses which have summer sores may be out of the normal line of development. It seems unlikely at the present time that summer sores arise as the result of horses lying down on floors or soil covered with manure and thereby bringing abraded areas in contact with the young worms in the manure. On the other hand, larval worms from the fly on transfer to the rich, warm culture medium afforded by a wound of any sort apparently are able to establish themselves in this location at least temporarily, their presence in the meantime causing an increase in the amount of pathological development in the sore. Whether any of these immature worms may be transferred back to the direct line of development in the horse is as yet uncertain.

As regards treatment, no adequate tests of anthelmintics for these worms in the stomach of the horse have yet been made, but American wormseed oil would probably be effective against *H. muscae* and *H. microstoma*, and in carbon bisulphid we have a very penetrating, highly solvent and quite toxic substance which exerts its greatest force in the stomach and which on theoretical grounds deserves to be tested against the ulcer-forming *H. megastoma*. In summer sores early and complete ablation of the diseased skin appears to be the best treatment.

Prophylaxis is evidently summed up in manure control and fly control. Cleanliness would evidently be of value around stables and yards in preventing fly breeding. There are a number of ways in which manure may be handled so as to prevent fly breeding, and one of these ways should be used. The maggot trap, which is essentially a platform for manure built over water, is one of these devices, and the burial of fresh manure daily under old manure to cause overheating to a temperature unfavorable to maggot development is another. The fly-tight manure bin is another device often mentioned, but experience shows that there are few of these bins that are actually fly-tight. Such a construction is difficult and rarely attained. Removing manure promptly to the fields and spreading it thin to facilitate drying is an efficient measure where it is feasible.

In the South conditions favor the development of this worm. Climatic conditions are ideal for the development of the house fly and the stable fly, and labor conditions and other conditions inter-

fere with the general adoption of measures for a more sanitary way of handling manure and raising horses. Nevertheless, with a prospect of avoiding definite evils in view, a man will do more than he will with no evident end or only a vague betterment in prospect. It remains for the veterinarian of the South to give habronemiasis attention and to ascertain the extent to which it deserves consideration. For years a disease called leeches or leeching has existed in Florida. From the available evidence in print it would appear likely that this disease is cutaneous habronemiasis, and this is something that warrants investigation. If it is this, here is an interesting field of practice and prophylaxis for the veterinarian in Florida.

Liver Flukes

Another group of parasitic pests in the South, with a well-established record of damage to their account, are the liver flukes. Both the common liver fluke of sheep, occasionally present in cattle, and the large liver fluke of cattle, occasionally present in sheep, are widely distributed over the South along the Gulf coast and back along the river valleys opening on the coast. In the case of the common liver fluke we are dealing with a disease that has a well-established clinical picture, easily recognized by the sheepman as liver rot, which does not need a nice consideration of involved factors to ascertain whether it is really injurious. It should be of interest to the veterinarians in the laboratories of the South to know that although certain species of snails have been shown to act as intermediate hosts in other countries, the snail which functions as the intermediate host of this worm in the United States has never been determined, so that here is a good opportunity for profitable research. The disease should be of interest to the practitioner in the South for the reason that it is a disease that often occasions severe losses and for which there is a medicinal treatment established by excellent authorities in Europe on the basis of critical test.

The treatment which has been recommended by the French authorities calls for the administration of oleoresin of male fern to sheep in doses of 3 to 5 grams, according to the size of the sheep, in 10 mils of a non-purgative oil, two hours before feeding in the morning, on five consecutive mornings, using male fern with a content of at least 24 per cent filicine and 3.5 per cent filicic acid. The dose for cattle is 12 to 25 grams, according to the size of the animal. The treatment recommended by the Hungarian authorities calls for the administration of powdered kamala in amounts of

15 grams, given in from 1 to 5 doses; strong animals may be given the entire amount at one dose, animals in general being given it in two doses at a 12- to 24-hour interval, and weak animals being given the treatment in five doses. The dose for cattle is 0.139 to 0.26 grams per kilo of live weight.

The large liver fluke offers even better opportunity for research in that nothing whatever is known as to the intermediate host, though it is presumably a snail. This parasite seems to be more pathogenic for sheep, though of more common occurrence in cattle. It is of interest in meat inspection in that it occasions considerable aggregate loss from condemned livers. No treatment has yet been developed, and it would be of considerable interest to know how the male fern and kamala treatments would operate in cases of infestation with this worm.

Prophylaxis in the case of both these flukes is evidently a matter of keeping sheep off wet pasture. Since much of the pasture in the South is of this sort, it is evident that attention should be directed to draining such pastures wherever feasible. Where there is only a small amount of such pasture on a farm, this pasture should be fenced off from sheep as dangerous, and if it must be used it would be advisable to use it for mature horses and cattle and not for sheep or young animals of any sort, and to use dressings of lime and salt in June, July and August to kill embryos and larvæ of flukes and to kill and repel snails. It is said that sheep never become infested with flukes on salt marshes. Infected sheep should be isolated and treated or else butchered before they have lost condition and become unfit for food. Where fluke is present it is advisable to treat the flock at the beginning of the winter after the danger from fresh infestation is past. Safe drinking supplies are essential, as the infection may be water borne.

Miscellaneous Parasites

The tapeworms of sheep and cattle constitute a group of parasites which are distinctly detrimental to the health, growth and development of the host animals, according to a growing mass of evidence. At the present time they present an attractive field of research to the veterinarian in the South and elsewhere, as the life history of none of these tapeworms is known and we are therefore without knowledge of suitable prophylaxis, and have moreover little evidence with regard to a satisfactory treatment.

The screw worm and the wool-maggot flies are pests with which every veterinarian in the South should be familiar. The screw

worm is now and has long been a cause of serious losses, and the wool-maggot flies have become such in Australia and may become equally important here. Treatment for screw worm usually consists in pouring chloroform into the affected places, later removing the maggots with forceps, washing with a disinfectant, and covering with pine tar to prevent fresh attacks. Preventive measures are of importance to the southern veterinarian in his surgical work, as operation wounds may readily become infested with screw worms unless covered with pine tar or similar repellents. Similar treatment and prophylaxis applies to the sheep-wool maggots.

A measure of great importance, and one that needs special emphasis in the South, is the prompt destruction of carcasses. Farmers and stockmen are often not very careful in regard to the disposal of carcasses. They are frequently allowed to lie in the fields to rot. On the dry prairies of the West such carcasses may speedily dry to the point where flies can no longer breed on them, though even there fly-breeding in such carcasses is common; but in the South these bodies offer exceptional opportunity for screw worms, flesh flies and blow flies of many kinds. The flies which are accustomed to produce the various sorts of fly-blow in stock are flies which habitually blow carcasses, and the habit of attacking live animals appears to be a rather recent one. In some species in Australia the habit of attacking sheep is one that has developed within the memory of the present generation, and other species appear to be acquiring the habit. The more plentiful the flies are, the greater number there will be seeking favorable places for depositing their eggs, and the greater likelihood of wounds, matted wool, and other places on animals being used for the purpose. Conversely, the destruction of each carcass diminishes the number of future flies by thousands and tends to restrict the activities of the smaller number that are produced. There has long been an attractive bit of poesy about the fly that takes the unattractive material afforded by the rotten flesh, manure heaps, and other unesthetic objects and converts it into a beautiful winged thing. Such poetic imagery begins to limp a bit when the fly begins to convert wool and mutton and beef into flies, thereby preventing the wool from going into clothing and the meats into sustenance for man. A similar happy-go-lucky policy with regard to the turkey buzzard as a scavenger has allowed that distributor of anthrax and hog cholera to thrive and multiply. Neither poetry nor laziness can make a good case for the man who leaves a rotten carcass to Nature to dispose of, when he should attend to it himself. Nature

will dispose of it, but without reference to the health of the man and his live stock or the effect on the purse. Carcasses in the field breed flies, disease, trouble and financial loss. The veterinarian in the South can do much educational work along this line among his clients. Another field in which the southern veterinarian can do much for his clients is along the line of ox-warble control. Where there have been concerted efforts to combat this pest by squeezing out the warbles from the backs of cattle and destroying the grubs, great benefit has been reported.

Conclusion

There are many other parasites that might be mentioned, but enough have been discussed to indicate the importance of the subject to the southern veterinarian. The very fact that the South has a semi-tropical climate, in some places practically a tropical climate, and that parasites are of major interest in the tropics, warrants an interest in this subject. It is not without reason that Tulane University in this city has a School of Tropical Medicine, one of the two in this country. For that matter, courses in tropical veterinary medicine might well be added to the curriculum of the veterinary schools in the South, and a one-year postgraduate course along this line would undoubtedly produce wonderful results under capable direction. No one in the South has yet made and published the results on a series of, say, 100 postmortem examinations of dogs for parasites, and yet the casual examinations that have been made disclose such interesting findings as a species of echinorhynch in Texas. It is highly probable that the establishment of research and postgraduate work along the line of parasitology in the South would not only greatly increase our information concerning known parasites, but also bring to light new parasites and new parasitic diseases, and that some of them might easily prove to be of great importance. Such departments would give a stimulus to the southern practitioner in studying parasitic conditions and aid him in his practice by advice and actual assistance where necessary. We have had enough instances in recent years of important parasitic conditions being overlooked or confused with other conditions, such as sheep measles and ascarid pneumonia, to demonstrate that there is much that we do not know that should be known. This is perhaps truer of parasitology than of most fields of veterinary medicine, and the southern practitioner or laboratory man who spends time in a serious consideration of this topic is spending it on a subject that promises abundant returns and rewards.

THOUGHTS ON INSECTS IN RELATION TO PRODUCTION OF LIVE STOCK AND POULTRY[1]

By F. C. BISHOPP, *Dallas, Texas.*

AS suggested by the title, my remarks will be of a more or less rambling nature. While no doubt much that I shall say is well known to many of those here, it is my hope that this discussion will direct your attention to the importance of insects to the live stock and poultry industries, to the multiple bearings of insect problems on the successful development of these industries, and above all to suggest points of common interest between the veterinarians and the entomologists. Perhaps also some ways may be indicated in which workers in these fields may be of mutual help in solving some of the problems relating to prevention of disease and abatement of insect nuisances.

WAYS IN WHICH INSECTS CAUSE LOSS TO THESE INDUSTRIES

Insects materially affect live-stock production by depredating on ranges, pastures and crops which are depended upon for feed. This indirect relationship between insects and live-stock production will not be discussed here. There are, however, many ways in which live stock and poultry are directly affected by insects and related forms of animal life.

Insects and Disease

The relationship of insects and related forms to the spread of disease is a subject which has received much attention during the last few years, and even now it is safe to say we are just beginning to explore the fields in this direction. A rather crude survey of the literature indicates that there are about 150 different disease organisms which invade the warm-blooded animals, including man, in the transmission of which insects are more or less certainly connected. The number of species of insects concerned with the spread of these diseases is approximately 250. This does not include the several hundred species which cause injury or annoyance by their direct attack on animals. The major part of these insects have been studied in connection with the transmission of the different diseases of man. It is possible that animals even more frequently than man

[1] Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

serve as hosts for insect-borne disease organisms, owing to their greater exposure to attack of possible transmitters. It is also probable that a number of our more or less common diseases of live stock and fowls may be disseminated at least to some extent by insects, and in the case of those maladies, the etiology and method of spread of which have not been definitely determined, insects should be given careful consideration. In these categories might be mentioned infectious equine anemia, hog cholera, hemorrhagic septicemia and anthrax. In the transmission of some of these diseases insects already have been considered, although the proof of their exact relationship to the maladies has not been fully established.

Insects may act as disease vectors in two principal ways, namely, as mechanical carriers and as necessary intermediate hosts of disease organisms. The first of these groups may be illustrated by the transmission of typhoid by the house fly and the second by the carriage of malaria by anophelene mosquitoes. In the mechanical transmission of disease insects may function in a number of ways. The infection may be disseminated by blood-sucking forms, the organisms being carried on the proboscis or by being temporarily sucked up into the crop, while other insects act as carriers through their habits of visiting wounds, excrement, secretions and foods. In certain instances organisms may be taken up by insects and voided with excreta on susceptible hosts. Hence they gain entrance into the tissue through skin abrasions or through the punctures produced by the insects themselves.

It may be stated in general that those diseases which utilize insects as intermediate hosts are usually of the motile type such as the trypanosomes. The non-motile organisms such as the bacilli are carried largely by mechanical means either on the proboscis or feet of the insects or are taken up by the insect and passed out with the excreta.

In any of these groups insects may not only act as carriers of disease from one individual to another of the same species, but may carry the disease from one host to an entirely different one, as in the case of bubonic plague, which is transferred from rats to man by fleas.

In addition to the transmission of the lower organisms which carry disease, insects function to a considerable extent as intermediate hosts and therefore vectors of the parasitic worms. One of the most interesting and historic cases of this is the transmission of *Filaria bancrofti* by mosquitoes.

Injury by Direct Attack

1. *Injury due to blood-sucking habits.*—In all parts of the world, and especially in the tropics, blood-sucking insects are numerous and occur in varied forms. Of course these play an important part in the transmission of disease, but they are also of much importance as drains on the vitality of the host through the loss of blood and by introducing toxic substances into the host. In this country the most notable examples in this group are the stable fly, horn fly, the various horse flies, mosquitoes, buffalo gnats and ticks. They exhibit a wide diversity of habit and are to be found in all parts of the country. Under most favorable conditions any one of the forms may develop to serious proportions.

2. *By living in the host.*—The number of species concerned in this type of injury is comparatively small, consisting mainly of the bots and warbles and certain mites which infest the lungs and other tissues of the animal. The total amount of damage caused by them, however, is large. By their attack tissue injury is suffered, digestion interfered with, pus development encouraged, and nervous and other disturbances produced.

3. *By destroying tissue.*—A limited number of fly larvæ are known to infest wounds or attack the digestive tract after being swallowed, producing what is known as myiasis. In addition to tissue injury often generalized infections occur. As an example may be mentioned the screw worm of the Southwest.

4. *By annoyance.*—Deleterious effects from annoyance are observed in attacks by many of the above-mentioned forms. Loss of flesh, retarded development and decreased milk flow are often noted from annoyance produced by blood-sucking insects or those forms which cause great fear to live stock when they are depositing eggs, as in the case of the ox warble or heel flies and horse bots. Certain insects also worry animals a great deal by visiting the eyes and nose, and when present in great numbers by entering the air passages. Others cause annoyance by crawling over the body and gnawing at the skin, as in the case of the biting lice.

It is very difficult to weigh the losses produced by insects. Estimates of losses have been made in but few instances, but their magnitude can be judged by the following figures of losses in the United States, more or less accurately determined: Cattle tick, from forty to one hundred million dollars; ox warble, from fifty to two hundred million dollars; screw worm, four million dollars.

THE INTRODUCTION AND SPREAD OF INSECT PESTS

We find in looking over the list of our most serious live-stock and poultry parasites that the great majority of them are invaders from foreign lands. Some were evidently introduced at a very early period in the history of this country and we have no definite knowledge of how or when they came. This is probably true of the stable fly, various species of lice on domestic animals and fowls, and at least two of our common horse bots. The horn fly, on the other hand, is of comparatively recent introduction, being brought into this country about 1887. Its dissemination throughout the States, which took place during the next few years, has been rather closely followed and recorded. The nose fly or red-tailed bot fly appears to have been introduced into this country about 1898, and has during the intervening time spread over Montana, the Dakotas, and parts of Nebraska, Iowa and Minnesota.

Our native species, while fewer in number, are no less formidable in this connection. The cattle tick, it should be remembered, is probably an American species; at least the variety which infests our Southern States is distinct from forms occurring in South America, Africa and elsewhere. The spinose ear tick may be mentioned as another one of our native forms, and the screw worm is strictly American.

In considering the protection of the live-stock and poultry interests of the country it should of course be kept in mind that there are still many dangerous parasites present in other parts of the world which have not been introduced as yet. A knowledge of the importance of such parasites and of their life histories and habits, and therefore of the ways in which they are likely to be introduced, is of much importance if we are to succeed best in keeping out these pests.

There are many ways in which insects of this class can be introduced into this country from foreign lands. Animals themselves, including the lower forms, menageries, poultry, pets and large domestic animals are especially dangerous in connection with the introduction and spread of parasitic forms. Those parasites which remain on the host constantly or breed there are spread with the greatest facility. In this category are the various species of biting and sucking lice of birds and animals, the bots of mammals which spend several months in the digestive tracts or tissues of their hosts, and the different kinds of ticks which attach to their host and engorge

in periods ranging from a few hours to several months. The ticks all spend considerable time off the host while depositing eggs and while these are incubating. With those species of ticks which remain on the hosts for long periods transportation is easy, and there is some chance of other forms continuing to breed in association with the hosts in transit on boats.

Owing to the comparatively short life of the adult insects in the order Diptera, or flies, which group may be said to be the most important of the true insects in the dissemination of diseases of man and animals, there is less chance of their successful introduction in that stage from distant lands. The rapidity of modern ocean transportation is, however, greatly increasing this danger. The diverse breeding habits of the flies permit of their easy introduction in several ways. Many are excrement breeders and the young may develop in excreta on shipboard and be carried off in the immature stages or become adult in time to leave ships at unloading ports. Feed, bedding and crates should also be considered in this connection. During cold weather there is also some opportunity for adults to be introduced in a dormant or hibernating condition with feeds, packing or other cargo. Ship ballast may be a source of introduction for certain noxious forms.

Either with native or introduced pests there are many means of dispersion as well as important geographic and especially climatic bearers. The repeated recurrence of Texas fever among the northern nonimmune cattle in the pre-quarantine days is a notable example. The tick, and with it a dangerous disease organism in these cases, was introduced into noninfected territory through the shipment of the host. At the same time climatic bearers—cold and aridity—operated to kill out the tick again in the North and much of the West. A very similar set of conditions prevailed in regard to yellow fever in man. The disease once introduced wrought havoc until cold weather came and destroyed the mosquito vector, thus reducing the infested area to the warmer portions of the country. The case of the so-called European ox warble, *Hypoderma bovis*, is a good example of the effect of climatic restrictions on spread. This warble has been introduced repeatedly in the South in the bodies of cattle shipped from the Northeastern States, but it appears never to have established itself in the warmer regions of this country.

In addition to the several means of dissemination mentioned, there is a limited opportunity offered for spread in connection with the shipment of animal products as wool, mohair, hides, etc., and in

animal excreta used as fertilizer, also by natural agencies as wind, floods, etc. Furthermore, the free-flying forms—notably the flies—may spread by flight. This method of dissemination, while of much less importance than the shipment of infested animals, appears in the light of recent work to be of greater importance than formerly supposed. In experiments carried out by Mr. E. W. Laake and the writer it was determined by releasing and recapturing marked flies that they could travel considerable distances in a rather short time. Screw worm flies were recovered 15 miles from the point of liberation and the common black blow fly and the house fly 11 and 13 miles, respectively, from the point of release. We have secured evidence also which strongly indicates that a number of our common flies may by successive flights and breeding periods spread distances of hundreds of miles.

The importance of a knowledge of phenomena connected with the dispersion of insects is at once apparent when we come to a study of their relationship to disease.

In permitting the limitation of spread of species to be controlled by natural factors alone there is to be considered the danger of insects adapting themselves to varied conditions of life and thus becoming increasingly important as pests. Moreover, there may at times prevail a set of conditions which are temporarily favorable for the spread of a species and with it some dangerous disease which in turn may be carried by some other agency in the newly invaded region even after the introduced vector has disappeared.

A few other illustrations follow of pests which occur in this country and regarding which I believe the people, and especially those concerned with the enforcement of restrictive regulations along this line, should become more familiar: the fowl tick, ear tick, spotted fever tick, tropical fowl mite, nose fly and pigeon hippoboscid. Three of these are known agencies in the dissemination of disease. The fowl tick, which is one of the most serious pests of poultry in the Southwest, is gradually invading new territory, although it is believed it will always remain largely restricted to the semi-arid regions. This species is a proven carrier of a spirochetosis of fowls in South America and other countries, although this disease is not known here. The ear tick, a pest of considerable importance to cattle and other live stock, has been introduced in the Northern States of the Rocky Mountain region in the last few years, although it is largely restricted by the same climatic bearers as the fowl tick. The nose fly, which has been mentioned previously, is gradually

spreading eastward and southward from Montana or southeastern North Dakota, where it was apparently first introduced. It is really surprising that this important pest of horses has not been widely spread over the country during the last few years when many animals were shipped out of the infested territory for war purposes. There is little clear evidence that the spotted fever tick is spreading to any extent, but we know that the dangerous disease of man which is carried by this species in the northern Rocky Mountain region can be transmitted by a number of other common ticks of the country. Since we also know that the disease does not occur throughout all the territory covered by the spotted fever tick, but appears to be spreading, there is need of giving serious consideration to the question of the scattering of this tick on horses and cattle, which are the principal hosts of the adult.

In this discussion I have strived to bring out a few points which may be of some practical value in the prevention of the introduction of noxious parasites of animals and the restriction of their spread when once in this country. I think it is apparent to all that there is a need of accurate information as to the life history and seasonal history of the various forms, both native and foreign, in order that this control and quarantine work may be effectually carried out.

Often restrictions are proposed which are of doubtful value in preventing the importation of pests and which may be a serious handicap to the industries involved. It is noted that Australia maintains a quarantine on cattle shipped from the United States, Great Britain and Canada during all seasons except the period between October and May, with a view to excluding the ox warble. An understanding of the seasonal history of this pest clearly shows that such restrictions would by no means give the desired protection. Within our own country the question has been brought up of eliminating the danger of spreading the winter or elk tick into various districts. This species is a serious pest of horses and cattle as well as elk in the northern Rocky Mountain region. It has been determined that this tick is not to be found upon hosts during the summer months; hence this immediately suggests the possibility of shipping elk or other hosts from infested territory during the summer.

It is important also that consideration be given the strong probability that insects already established in a region may assume much importance as pests owing to changes in agricultural practices which often have the effect of upsetting the balance of nature existing.

COOPERATION OF A NUMBER OF AGENCIES NECESSARY IN WORKING OUT MATTERS APPERTAINING TO THE RELATION OF INSECTS TO ANIMALS

There is much need, it would seem to the writer, of additional data on the precise effect of the multitude of insects affecting live stock and poultry upon the industries involved. Careful work to determine the effect of a number of the important insects on the health, growth, fattening and production of animals would give the agencies concerned with control as well as the people otherwise interested a definite idea of the importance of carrying out such control measures. In but very few instances have we at hand any reliable figures along these lines. It may be that the procuring of such data would materially change our ideas as to the need of carrying out vigorous control campaigns against the different insects involved. In other words, some may be of much greater and others of less importance than we suppose. The coöperation of the veterinarian, the animal husbandman and the entomologist would greatly facilitate the accumulation of accurate data along these lines. Again, the study of the relation of certain insects to disease or the transmission of certain diseases by insects could undoubtedly be carried on with profit by similar coöperative effort. Another field of rather less importance, however, in which the entomologist feels the need of help from the veterinarian or animal physiologist is in determining the effect of insecticides upon the different hosts treated.

The carrying out of control campaigns would probably also proceed best in many instances through coöperative arrangements. For instance, in endeavoring to put into effect proper range sanitation measures we observe a many-sided problem. Carcass disposal is of the utmost importance in the warfare against certain diseases such as anthrax and blackleg. The same practice is also necessary to accomplish the control of the important live-stock pest in the Southwest known as the screw worm. In fact, we believe that should range sanitation be carried out in a thoroughgoing manner the screw worm, which now is responsible for millions of dollars of loss annually, would be rendered of little importance.

Coöperation in reporting on abundance, injury and spread of injurious species would undoubtedly materially benefit the industries concerned.

Looking forward in the field of live-stock and poultry parasite control, it may not be too visionary to picture the eradication, either

locally or perhaps nation wide, of a large number of our common live-stock and poultry parasites, just as the cattle tick is being wiped out of our Southern States. In fact, many of those pests which perhaps are of considerably less importance than the cattle tick would be much more easily eradicated than that species. The common lice of horses, cattle, goats and hogs would fall in this category, as would probably the ox warble. Poultry lice, as has been shown in recent work carried on by the Bureau of Entomology, can be very readily eradicated from flocks. It is of course possible, although perhaps not feasible at this time, to accomplish the same result throughout a community, county, State or nation as is done by the individual.

Dr. Charles B. Noback, veterinarian in the New York City Health Department for the past eight years and previously connected with the Bureau of Animal Industry, has secured a position with the Laboratorio di Higine, Bogota, Colombia, South America. The directors of this concern are Drs. Bernard Samper and George Martinez.

Dr. Noback, before leaving for Colombia, is making an extensive trip through the United States to obtain information concerning such diseases as anthrax, septicemia hemorrhagica and government regulations concerning the manufacture of biological products.

Prof. W. L. Williams, of the New York State Veterinary College, Cornell University, has been granted leave of absence from commencement through the first term of next year. He will spend most of this period in the Hawaiian Islands as advisory veterinarian on the Carter ranch, a tract of some thirty square miles on which are herds aggregating nearly 80,000 head of cattle.

Dr. B. H. Ransom, Chief of the Zoölogical Division of the Bureau of Animal Industry, has been elected a corresponding member of the Société de Pathologie Exotique.

Drs. L. A. Merillat and J. R. Mohler have been elected foreign corresponding members of the Société Centrale de Médecine Vétérinaire of France.

At a meeting of the Board of Directors of The Chicago Veterinary College held at the college May 22, 1920, it was decided to suspend operation of the college.

TICK ERADICATION IN THE SOUTH[1]

By ERNEST I. SMITH, *Baton Rouge, La.*

TICK eradication is a subject that has intensely occupied the attention of the Bureau of Animal Industry and the various State live-stock sanitary boards since about 1905. Previous to that time serious losses occurred among the cattle in numerous places below the quarantine line and in instances where cattle were shipped across the line into the area known to be free of ticks. Therefore, in order to conserve fully the cattle industry in the South, it became necessary that the Federal and State forces coöperate to the end that the majority of the cattle owners of the Southern States be made to realize their predicament.

At that time, as well as later, the fundamental principle of eradicating the cattle tick depended upon securing the coöperation of the masses, and before such coöperation could be obtained it was necessary to conduct a general campaign of education, notably to convince the people of the damages that the tick was doing, and, in order that the losses might cease, devise a practicable method whereby the tick might be completely eradicated. Some learned men insisted that the officials undertake to discover a curative measure, but the majority of those who understood the life history of the cattle tick insisted that the dreaded parasite be forever eliminated from the United States.

In 1905 Dr. John R. Mohler, then Chief of the Pathological Division of the Bureau of Animal Industry, wrote Bulletin No. 78, entitled "Texas Fever, with Methods for Its Prevention." With due respect to all other similar bulletins, I believe it is safe to say that this one was the most explicit and complete that has ever been published. The color plates contained therein have served a very useful purpose and undoubtedly have helped many a perplexed mind to differentiate between the various varieties of ticks. Mohler says that, scientifically, the origin of the disease is unknown, but states that it has existed for centuries in some countries in Europe, mentioning southern France, Italy, Turkey and along the Danube River in Rumania, indicating that it is prevalent in the West Indies, Mexico, Central America, Australia, parts of Africa, Ireland, Finland, Germany, southern Russia, India, China, Japan, Java, Borneo and the Philippine Islands. He further states that the tick was

[1] Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

probably brought into the United States with the importation of cattle by the Spaniards during the early colonization of Mexico. Therefore we can readily see how it gained such a tremendous footing here in the South, because the traffic of cattle across the Rio Grande, from Mexico into Texas, was more or less continuous. We do not know just when the tick was introduced into the States, but it is safe to say that it might have been half a century ago. Therefore, in all the years that have passed, the spread of the fever tick throughout the Southern States has been an easy matter.

At the time that Bulletin No. 78 was published the quarantine line passed through about the lower third of Virginia, the extreme western end of North Carolina, zigzagging midway through Tennessee with an upshot into Kentucky, where three or four counties were included; thence across the boundary line between Arkansas and Missouri; a part of Oklahoma; then diagonally in a southwesterly direction across the western end of Oklahoma through northwest Texas to the Rio Grande River, just south of New Mexico, where it followed the boundary line between New Mexico and Arizona along the lower third of the eastern line of California; thence in an irregular manner across the State about half way up; thence across to the Pacific Ocean. Briefly, this included over one-half of California, three-fourths of Texas and Oklahoma, all of Arkansas, Louisiana, Mississippi, Alabama, Georgia and South Carolina, one-half of Tennessee, a small portion of Kentucky, about seven-eighths of North Carolina, and one-half of Virginia.

In those days it was a tremendous undertaking to think of ever being able to eradicate the cattle tick completely from such a vast area. The officials knew the life history of the tick, but the only methods available for the complete eradication were to employ the use of pasture rotation, on large ranches dip the cattle in Beaumont oil, gather them up in a corral and give them a lick or two with a greasy rag, or, in cases where practicable, hand-pick them. In spite of these slow advances, it was evident that the work must be done. A great project had been started and there was no turning back, even if it was a long trail to follow.

In 1906 Farmer's Bulletin No. 261, with the late August Mayer of Shreveport, La., as its author, was issued by the United States Department of Agriculture. In this bulletin Mr. Mayer points out that the coming of the Mexican boll weevil would to a certain extent prove to be a powerful reformer, as it would turn the mind of the southern agriculturist to other lines. Naturally he would first consider the cattle industry, all of which would make him

eager and anxious to learn everything possible regarding the eradication of the cattle tick. Evidently Mr. Mayer had a very broad vision. He stated emphatically that he considered the presence of the tick the sole reason why the South was not a cattle country. It must be remembered that he was a resident cattle raiser in the heart of the tick territory, where the parasite continued to multiply until late in the fall and commenced operations early the following February. All cattle were heavily infested, with the exception of a very few purebred herds. The author speaks of a few men who undertook to immunize the cattle against Texas fever by the subcutaneous injection of blood from a tick-infested native animal, which did reduce the losses of imported nonimmune cattle to about 8 per cent, but he recognized it to be an inadequate measure, inasmuch as it did not offer the proper solution for the tick problem. His main idea appeared to be complete destruction of the cattle tick.

A few years later the Bureau of Animal Industry commenced to establish a few offices in the Southern States in coöperation with the live-stock sanitary boards for the purpose of gaining more information relative to the eradication of the tick. The appropriations were small, and public sentiment was at a low ebb. Moreover, there was very little, if any, State legislation which could be applied to the project. Therefore it remained for the inspectors to go out among the cattle owners and spread the gospel of tick eradication. Much pioneer work was done, and the inspector who has labored so faithfully since the commencement of the work up to the present time should be decorated with a medal of honor. He was combating against the resistance of centuries. Not only did the lower class of people think he was a splendid prospect for the insane asylum, but those who appeared to have good training and unbiased minds would often turn away in disgust whenever the subject of tick eradication was mentioned. Sometimes little meetings were called at country school houses, village stores, barbecues, and fairs, where the inspector with considerable tact and diplomacy might be able timidly to approach the subject. However, this opposition was quickly overcome, as in every community the inspector was able to find a leader who proved to be a key to the situation. If this leader was in favor of tick eradication, a formidable barrier had been broken down; but if he was against tick eradication, there was left only one enemy to fight.

The Bureau of Animal Industry recognized the fact that the project was a very difficult one, and in every instance was extremely

charitable toward the inspectors. Some men were not cut out for the work. They did not possess the qualifications. Nevertheless in other divisions of the Bureau they were regarded as highly efficient. Some of them were not fitted to engage in every phase of the project. Notably, some men were extremely well equipped to carry on an educational propaganda; others were fitted to direct the systematic end; and another class were able to step in and smooth over little difficulties and succeed in directing the work to the end that the last tick was destroyed.

Before dipping vats came into use the States of Tennessee and Kentucky and, I believe, California, succeeded in having most of their ticky area released from quarantine, and this feature of the work paved the way for the general construction of dipping vats for the use of arsenical solution, which has since proved so popular. It was interesting to note that when a county decided to carry on tick eradication the same spirit of progression would quickly radiate into adjacent counties. Therefore, when the work assumed large proportions in any one State, the effects were quickly felt in adjacent States. As time progressed, necessarily a considerable amount of money was expended and millions of cattle had lost their immunity. Consequently, the counties which had been released commenced to demand State protection and insisted that every county provide means for the complete eradication of the cattle tick. By this time a majority of the people had become thoroughly educated to the fact that tick eradication was a success and that it was an investment instead of an expenditure. The professional man, the merchant, the planter, and the average cattle owner suddenly woke up and saw wherein something drastic must be done in order to protect the cattle which had lost their immunity. A number of purebred herds had been established, and cattlemen were clamoring for better stock to improve the best class of native cattle. In the face of these conditions it is obvious why the various States took the matter in hand.

The first great commonwealth to pass a State-wide law was Mississippi, followed by Louisiana, Texas, Alabama and Georgia, and we must realize that before such a State-wide law could be passed the majority of public sentiment must be back of it, because, as we understand the average legislator, he would not listen to such a bill unless it had the indorsement of his constituents. From past experience we are of the opinion that the State-wide law governing the work of tick eradication is the only solution of the problem. It gives an equal distribution of funds, brings about a uniformity of

law, and, above all, adds a greater dignity to the work by recognizing it as compulsory on the statute books of the State.

At the present time much of the area that was originally quarantined has been released, and from present indications within five years the tick will be a matter of history. Some scientific institutions are commencing to collect samples of ticks to preserve for future study. Considering the great volume of opposition against the eradication of the tick, the southern people have given splendid coöperation. All arguments in opposition were born of ignorance. Therefore, if a man does not understand, it is natural for him to be skeptical. The circulation of Govenment and State bulletins helped to a large extent to break down the misunderstanding, and another agency which has contributed a large part toward the work has been the newspapers. They have been quick to recognize the advantages and have always been willing, as a rule, to publish anything that might clarify the subject. Their columns have been open, and if it had not been for their generosity I do not believe we would be so far advanced in the project as we are today.

Undoubtedly there is still more to learn about tick eradication, and every inspector in the field is anxious to perfect himself accordingly; but we do feel that the present methods are nearly perfect, and we would hesitate about making a drastic change. Up to December 1, 1918, 63 per cent of the territory originally quarantined had been released. This proves that the methods employed were satisfactory, and it shows that our appeal to the people was logical, or else no such large percentage could have been released from Federal quarantine.

Without fear of contradiction, permit me to say that the United States Bureau of Animal Industry, the various State live-stock sanitary boards, the parish and county governing officers, and the majority of the people have contributed their part toward tick eradication. Furthermore, in all the States where cases have been brought to the Supreme Court, the tribunal has always upheld the law—in other words, declared that it was constitutional and a public benefit.

As heretofore mentioned, the work has been a tremendous success, but in some counties where a considerable amount of money has been expended the proper results have not been obtained. In such cases we could analyze the situation and see wherein every body of officials had fulfilled all their obligations with the exception of the court officers. This places all the responsibility for the failure on the presiding judge, district attorney and sheriff. We

have featured this very strongly in Louisiana, and have discovered that the people strongly resent a tendency on the part of local courts not to enforce the law properly. If a judge is not doing his duty, the writer believes that we have the right to offer constructive criticism. In venturing such criticisms, we must show a due regard for the courts, and adhere strictly to the truth, basing our arguments on the fact that the law is on the statute books of the State, a great conservation measure and upheld by the Supreme Courts, and is intended to be enforced. Then the people can be shown wherein it will cost them thousands of dollars extra if the law-breaker is permitted to go free. Wherever I have had an opportunity to observe, the reaction has been all that we could desire. We do not preach persecution, but prosecution in cases where a man wilfully, intentionally and maliciously violates the law. The work must be uniform, and every one must coöperate to the finish in order to spend the minimum amount of money. If the law is not properly enforced, it creates a spirit of doubt in the minds of those who are willing to be governed accordingly. Therefore, you mix a few intentional violators with a number of doubters, and you have a conglomeration that will be soon beyond control of the courts.

Within the last few years tick eradication has been going full speed in all the Southern States, and during 1918 and 1919 the gains have been tremendous. In 1919 the number of square miles being worked totals 348,133. In the prosecution of this work this year the Bureau furnished 319 men, the States 533 men and the counties 1,850 men. The total approximate cost to the Bureau was $655,078.04, to the States $499,003.80, and to the counties $2,428,-901.15. The total approximate quantity of proprietary cattle dip that the various States have used this year is 250,196 gallons. Some of the States used the crude chemicals, and some of the counties in various States did likewise. The figures show that there were used 903,553 pounds of arsenic this year. The total number of cattle dippings in 1919, up to November 1, is 48,530,229. Some of these dippings include horses and mules, but we have a separate record for horses and mules, and the total number of such dippings up to November 1, this year, is 311,014. The number of vats in operation to produce these enormous figures is 35,534. Effective December 1, 1919, there will be available for release from quarantine in the Southern States 47,321 square miles, which will leave remaining under quarantine 220,426 square miles.

Previous to the writing of this article a letter was sent to the State Veterinarians in all the Southern States, requesting some informa-

tion along the lines of introduction of purebred stock and a few advantages due to tick eradication. Their answers should be looked upon as very dependable and suggestive of what can be accomplished if the live-stock industry is given further attention under the direction of a systematic organization. A report from nine of these states (figures for 1919) shows that approximately 19,170 purebred cattle or high-class grades for milk stock were brought into the South. In addition there were brought in 22,863 head of purebred cattle or high-class grades for beef stock. One State Veterinarian said there was no increase of cattle brought in over previous years; another estimated it at 25 per cent increase; another said 50 per cent increase; another said 500 per cent from 1908 to 1912, and 200 per cent from 1912 to the present time; another claimed that the number had doubled; another said 90 per cent; another 100 per cent, and another said it would be difficult to estimate; another said from 10 to 50 per cent increase in registered cattle and 20 to 40 per cent in the grades. Their average answers in regard to the increase in the intrinsic value of the cattle since tick eradication was inaugurated ran from 20 to 100 per cent, and in addition they believe that land values have increased from 25 to 100 per cent, all largely credited to the project of tick eradication.

The supposition now is that since the peace dove set out to find that olive branch, she must have got hold of a ripe olive.—Columbus (Ohio) *Record.*

Unless the printer made a mistake, automobile breeding is being practiced in Alabama, as indicated by the following advertisement in the Tuscaloosa *News:*

> FOR SALE—Chevrolet, Sedan, first with young calves. J. F. Conway, R. F. D. No. 1, at 6 mile post on Greensboro Road.

The following news item from Tiffin, Ohio, which recently appeared in the Toledo *Blade*, records a novel contribution to the knowledge of natural history:

"A two-headed lamb was born Friday in the flock of Dr. A. C. Schafstall. Both heads were perfect; one was that of a male and the other a female. The lamb lived only a few hours. It is being mounted by a taxidermist."

BACCHARIS PTERONIOIDES AS A POISONOUS PLANT OF THE SOUTHWEST[1]

By C. DWIGHT MARSH, A. B. CLAWSON *and* W. W. EGGLESTON,
Washington, D. C.

FOR some years reports have been sent in to the Bureau of Animal Industry of losses of live stock in the southern portions of Arizona and New Mexico, which apparently were produced by some plant in the forage, but for which no recognized poisonous plant could be assigned as the cause. Repeated botanical examinations of the region failed to solve the problem. Gradually, however, suspicion became directed to *Baccharis pteronioides.*

In 1910 Supervisor R. H. Selkirk of the Coronado Garces National Forest wrote that this plant, known locally as "yerba manza," was said to be poisonous to cattle.

In 1915 a letter was received from County Superintendent of Schools W. C. Miller, Prescott, Ariz., who sent a sample of weed which he was certain was killing cattle. The plant was identified as *B. pteronioides.* Mr. Miller was asked to describe the symptoms exhibited by the animals and replied as follows:

"First. The cattle walk just as a foundered horse, seem stiff and act as if they were sore footed.

"Second. They will lie down in a shady, moist place, and any attempt to move them will seemingly make them worse, and after driving them a short distance they will tremble in the legs and shoulders and the head will jerk, and they will want to move it to one side.

"Third. They will lie down or fall in a fit.

"Fourth. When opened, the intestines are as if they had been burned with potash.

"If they are removed from the weed before they are far advanced, they will recover, but if they refuse to eat other things they will die. They usually get to eating it during stormy weather, and it seems to take quite a lot of it to affect them seriously. Cattle nearly always die from it when feed is scarce on the range or in a pasture."

In 1913, through the Forest Service, a jar of stomach contents with a number of suspected plants was received. Among the plants were found *B. pteronioides* and *B. bigelovii,* but they could not be

[1] Published by permission of the Secretary of Agriculture.

identified with certainty in the stomach contents, although it was considered possible that the Baccharis might be the cause of the poisoning.

In the summer of 1918, while making a study of the flora of the Lincoln National Forest (New Mexico), Mr. Eggleston found *B. pteronioides* abundant in localities where fall and winter losses occurred, and thought there was good evidence that it had been extensively grazed. This cumulative evidence led to some experimental feedings at the Salina experiment station to determine definitely whether the plant was poisonous or not.

It may be stated, too, that there was more reason for suspecting this plant since several members of the genus growing in Mexico and South America have been used in medicine, and one, *B. coridifolia*, commonly known as "mio-mio" or "romerillo," is a well-known cattle-poisoning plant in Argentina, counting among its victims also horses and sheep. This plant has been extensively investigated, not only as to its effects in the field, but also in regard to its chemical and pharmacological properties.

EVIDENCE FROM EXPERIMENTS AND FIELD OBSERVATIONS

A number of feeding experiments were made upon sheep. These experiments definitely demonstrated the poisonous nature of the plant and showed that the lethal dose for that animal is not far from 1 pound. This means that while it is not an acutely toxic plant, it is one of a decidedly dangerous character. The symptoms exhibited were not distinctly characteristic.

While it is necessary to make further detailed experiments with sheep and also cattle, it is considered definitely proved that the plant is poisonous to sheep and probably has a similar effect on cattle.

Inasmuch as in many places in southern Arizona and New Mexico where cattle have died from some unknown cause it has been found that not only *Baccharis pteronioides* has been present but also has been rather heavily grazed, it seems highly probable, in the light of the preliminary experimental work, that the plant is the cause of the trouble.

In the Chiricahua Mountains, Arizona, the cattle range during the summer in the mountains above the Baccharis belt where forage is abundant. In October they are driven into the foothills at a time when forage is scarce, and deaths occur from that time to mid-winter. A number of localities were visited in the Lincoln National

Forest, where cattle had died and where the Baccharis had been eaten.

It is not considered positively proved that the Baccharis was the cause of the deaths in these two Forests, but the probabilities are so great as to convince the authors that there is little question of the cause of the losses.

Fig. 1.—Baccharis pteronioides: The female plant in blossom

DESCRIPTION OF THE PLANT

Baccharis pteronioides, D. C. (*B. ramulosa* [D. C.] Gray)

The plant shown in figures 1 and 2 is a spreading shrub from 1 to 2 feet in height, its width often exceeding its height. Its branches are usually biennial, the new canes appearing in mid-

summer after the flowering which occurs in April or May. The single taproot often throws out suckers. The branches are longitudinally grooved, scabrous and warty, but become nearly smooth with age. The tips of the young branches and leaves are sticky. The leaves are in dense clusters, small, from 1/8 to 3/4 inch long, lanceolate-spatulate to linear in form, veinless, punctate-dotted on both sides, thickish, and 2 to 6 toothed.

Fig. 2.—Baccharis pteronioides: The male plant in blossom.

The flowers are in bell-shaped heads 1/4 inch broad, terminating densely leafy branchlets in a close racemelike manner. The flowers are of two sexes growing upon different shrubs. Figure 1 shows

the female flowers and figure 2 the male. The female flowers have a dusky white down about half an inch long.

The shrub grows in the foothills in gravelly or rocky soil of the slopes along the draws, preferring south slopes. Its known range of altitude is from 4,000 to 7,600 feet, but it is more commonly found between 5,000 and 6,000 feet, and it occurs from central Mexico through the Rocky Mountains of western Texas north to central New Mexico and eastern central Arizona.

PRACTICAL CONSIDERATIONS

As in the case of most other poisonous plants, it is probable that shortage of other forage is the main cause of animals grazing upon Baccharis. If the stockmen will learn to recognize the plant and note the localities where it is abundant, losses may be avoided by careful attention to their herds. It is especially important that half-fed animals should not be exposed to the temptation of eating the plant.

If, as now seems probable, *Baccharis pteronioides* proves to be an important poisonous plant, it is interesting to note that apparently its eradication will not be a difficult or expensive matter. It is local in its distribution and is easily destroyed, being commonly uprooted by two or three blows of a pick.

A detailed study of this plant is being carried on by the United States Department of Agriculture, and later a full report will be made.

AN APPEAL FROM AUSTRIAN VETERINARIANS

A letter addressed to the "Rectory of the College of Veterinary Surgeons in Philadelphia" has been received from the Association of the German Veterinary Surgeons in Salzburg stating that the veterinarians in that section of Austria are in great need and requesting assistance from American veterinarians. It is suggested that food drafts, which can be procured from any bank in the United States, be sent to the Association, Salzburg, Kaigasse 37, Austria, and proper distribution will be made of the foods purchased with them. There are thirty-one veterinarians in the district and the statement is made in the letter that they are willing to "repay when the value of our money again increases." L. K.

BETTER LIVE STOCK[1]

By W. J. BUTLER, *State Veterinarian, Helena, Mont.*

BETTER live stock means not only animals of better blood lines, but animals of stronger vitality, freer from disease and more capable of adapting themselves to climatic and feeding conditions. In the past we have been prone to consider the words "better live stock" as applying only to better blood lines. From an economic standpoint it is just as essential that animals be freer from diseases, have more vitality and be more capable of adapting themselves to feeding and climatic conditions of the country in which they are being raised as it is for them to be bred along better blood lines. Pick your sires from herds bred along these lines and not bred for the show ring. If we desire to make a financial success of stock raising, the scrub animal must go.

The necessity of good cattle was clearly demonstrated a few years ago when eastern dogies were shipped into Montana. It is true that some speculators made money on these animals, but I have yet to meet the legitimate stock man who made a profit on running eastern dogies in this State. Eastern dogies are not properly bred. They can not stand our climatic conditions, neither can they properly digest and assimilate our roughage feed. They are not the proper cattle for Montana. They do not have the rugged vitality of a range animal. Their hide is thin; they can not stand cold weather. They do not have sufficient vitality to digest and assimilate their food and at the same time maintain body heat.

The normal temperature of a cow is 101° F. This temperature must be maintained at all times and under all conditions. If it falls below normal, digestion and assimilation stop, pathologic changes take place and death may result. When our winter temperature is 20 degrees below zero, the difference between the temperature on the outside of an animal's skin and on the inside of that animals skin is 121° F. You will therefore realize the absolute necessity of an animal being provided with a thick hide, well protected with hair, and possessing a rugged constitution so it may digest and assimilate its food.

I desire to impress upon you the absolute necessity of purchasing and raising cattle that are bred along well established blood lines and at the same time are rugged and sound.

---

[1] Paper presented at the thirty-fifth annual meeting of the Montana Stock Growers' Association, Billings, Mont.

Montana is a range country. It is a short-grass country in the northern part of the temperate zone. Therefore it should not be considered a breeding country. It is better adapted for running steers. That does not mean that we must not breed cows. We must maintain a certain number of breeding cattle. The number of breeding cows, however, which we maintain must be absolutely limited by the means we have at hand to feed and care for them properly, both before and after calving. With our changed conditions it is a prime necessity to feed a breeding cow concentrates. such as cottonseed cake, copra or corn, with a sufficient quantity of hay. It is equally essential to feed calves.

It has been the dream of those advocating ploughing our natural range country to have small farms on every section in the State. They say each one of these farms will grow, feed and raise live stock. I wish I had their optimism; but never as long as you or I live will they profitably grow feed and raise live stock year in and year out on small dry-land farms in this State under existing conditions and with our present knowledge of farming. There are wonderful farming sections in Montana, but they are not in what we know as our arid or semi-arid short-grass range country.

Nature grows short grass for a distinct and definite purpose. It is that it may cure naturally on the stem and retain all of its proteids, carbohydrates and vitamines in order that live stock may live and thrive on it the entire year round. In this way nature has provided a grass-balanced ration for range live stock. Vitamines are complex organic substances occurring in small quantities in many feeds, upon which health and life itself depend. The lack of vitamines in the human produces such diseases as scurvy and beriberi. Vitamines are the substances which stimulate the growth and development of an animal. Green grass and short grass contain an abundance of vitamines. That is one reason why that kind of grass is such a wonderful food and why such exceptionally developed and finished animals have been produced on the open range.

Immatured hay contains more vitamines than natural hay. Likewise hay grown and cured in an arid or semi-arid country contains and retains more water-soluble vitamines than that grown and cured in a humid country. That is the principal reason why Montana hay is superior to eastern hay. Unfortunately hay which is cured after it is cut does not permanently retain its vitamines. The older it grows the more vitamines it loses and the less nourishing and less of a balanced ration it becomes. Matured hay supplies

the carbohydrates and the bulk so necessary for body heat, but if fed over an extended period of time it must be fed in conjunction with some other feed containing proteids and vitamines and laxative qualities, such as cottonseed cake, copra, corn, or possibly immatured hay or ensilage. For extended winter feeding, if it is impossible to ship in and feed concentrate I recommend that you secure one cutting of immatured hay to feed with your matured hay. It is not to be understood by this statement that immatured hay cut and stacked is a balanced ration, or is superior or even equal to concentrates such as cottonseed cake, copra or corn. It is not a balanced ration. Neither is it the equal of concentrates. Immatured hay recommended is not grass cut in the wet, undeveloped, green stage, but hay cut just previous to its becoming matured. May this not be one of the main factors why sections like the Big Hole country in Montana or North Park in Colorado produce such wonderful hay-fed cattle? Their growing season is oftentimes too short to thoroughly ripen and mature hay. However, feeding experiments alone will determine the definite value of immatured hay when fed in conjunction with matured hay, and the proper time at which it should be cut and stacked.

A strictly matured hay diet is not a balanced ration, and if fed over a considerable period of time will result in digestive disturbances which will cause autointoxication and possibly terminate in the death of the animal. The symptoms in such cases are stiffness, oftentimes associated with stringhalt, staggering gait, falling to the ground, rolling of the eyes, paralysis, generally in the hind legs and quarters, and in some cases convulsions may be present. The appetite and excretions of the animal apparently may be normal. The period of attack varies from one to three hours to a day. Recovery or death depends upon severity of attack and quality and kind of feed available. Recovery from first attack in many cases is followed by a second attack in from 7 to 14 days.

We have had many such cases this past winter. This condition was not always confined to the weak animals; in fact, in many instances it was apparently the strongest animals in the herd that were affected. This led to the belief on the part of many owners that their animals were affected with an infectious contagious disease. In not one instance where the symptoms which I have described were present did we find an infectious contagious disease. In each and every case we determined that the primary cause of the condition was due to a feeding deficiency or an unbalanced ration.

It may sound paradoxical, but in a short-grass country, where

there is natural protection and the range is not overstocked, it is more humane to run animals on the open range than it is to confine them in a small pasture or barnyard and feed them a strictly matured hay diet over an extended period of time.

In addition to vitamines so essential to life and development, growing animals require a certain amount of exercise, thus the desirability of an open range or a large pasture. Animals also require a good water supply. If an open spring or an artesian well is not available it will pay 100 cents on the dollar to build water tanks and put in tank heaters.

The more you confine animals the more diseases and trouble you may expect, and the more expensive will be their production.

Montana is fundamentally a range or a large-pasture country. It is not a country for dogie cattle confined in a barnyard. A realization of these facts, together with a realization of the necessity of feeding food possessing laxative qualities and containing vitamines and proteids, along with our matured hay, will tend to develop better live stock and to make the live-stock industry more staple and profitable.

FIFTY-SEVENTH ANNUAL MEETING

AMERICAN VETERINARY MEDICAL ASSOCIATION

COLUMBUS, OHIO, AUGUST 23-27, 1920

Our Aim: 2,000 members, 1,000 non-members. Bring the ladies.

General Sessions. Section on General Practice. Section on Sanitary Science and Police.

President Cary and Secretary Mayo are planning to make this a meeting of unusual interest and benefit to the practitioner.

Make your hotel reservations early. See particulars in the June JOURNAL, page 333. The Committee on Local Arrangements will be glad to give further information. Address the Chairman, Dr. F. A. Lambert, 1996 Summit Street, or the President of the Ohio Veterinary Medical Association, Dr. O. V. Brumley, Ohio State University, Columbus, Ohio.

TUBERCULOSIS ERADICATION: ITS AIMS, METHODS AND ULTIMATE GOAL[1]

By JOHN A. KIERNAN, *Washington, D. C.*

IN the brief space of time allotted to this subject I shall endeavor to develop only a few of the salient phases of the tuberculosis eradication campaign. It shall be my endeavor at some future time to take up other features of the subject and elaborate on them sufficiently to outline in general a comprehensive plan of putting this great crusade against tuberculosis of live stock in operation on a Nation-wide basis.

The three topics to be discussed at this time are: (1) The personnel of the forces engaged in the campaign; (2) the accredited-herd plan; (3) infected areas versus free area.

When tuberculosis eradication work was taken up on a coöperative basis, in May, 1917, there were employed by the Federal Government approximately ten veterinary inspectors who were devoting their entire time to this work. Their efforts were confined to a territory in or about the Nation's capital. From time to time employees were detailed from various field stations to apply tuberculin tests to herds whose owners were particularly interested in the subjct, but these herds in the aggregate numbered probably less than 100. In many States, however, comparatively large forces of State employees, numbering from 3 to 10 veterinarians, were engaged in combating the disease.

I desire to commend most highly the foresight and determination of the State veterinarians of those States for the splendid work they accomplished. From the very earliest period of which we have record of the organization of veterinary forces throughout the United States, we observed that leaders in many commonwealths had made plans for controlling and exterminating tuberculosis of animals. It would be a gross injustice to our contemporaries not to give just credit for the inspiring and lofty plans conceived and put into execution by such shining lights of the veterinary profession as Pearson of Pennsylvania, Ward of Minnesota, Dyson of Illinois, and many others. To their imperishable records I humbly pay obeisance. To the lamented Melvin I also bow in reverence, to his broad-visioned conception of the idea to launch this campaign before tuberculosis had gained the master hand over the animal industry of America.

[1] Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

With but one more well-deserved word of commendation, I shall proceed to discuss the features of the work mentioned; but I trust that this humble effort to place in proper juxtaposition a few eminent names will have its place in the archives of veterinary medicine in America for just this one purpose—to give credit to those to whom credit belongs for this work which promises to be an epoch-making event in the annals of live-stock sanitary work throughout the world. To a former Member of Congress, Hon. Charles H. Sloan, the Nation is indebted for his untiring interest and his great perception of the necessity of protecting the live-stock industry of America from the ravages of disease. It was he who introduced the first bill in Congress to appropriate funds to be used in the control of hog cholera. After guiding this work through the perilous paths of our legislative halls he turned to lend his able support to the next great problem he belived should be solved, and he introduced in Congress a bill to provide the Department of Agriculture with $1,000,000 for the control and eradication of tuberculosis of live stock. He is no longer a Member of Congress, but the deeds he did will long remain to his credit and will be regarded as masterpieces of statesmanship.

THE PERSONNEL OF THE FORCES ENGAGED IN THE CAMPAIGN

In reviewing the live-stock laws and the rules and regulations of the respective States we observe that for more than ten years practically every commonwealth required that before cattle could be introduced from other States for breeding and dairy purposes they should be free from tuberculosis as determined by the tuberculin test and physical examination. It would seem that by such a restriction it would be well-nigh impossible for that disease to spread from one State into another. It would seem that such a provision would be a barrier that could in no way be hurdled or passed over. It sounds ideal, and it would have terminated with ideal results had every element entering into it observed its tenets. Alas! the purposes for which such laws and regulations were designed were not altogether accomplished, and I may say that they were very far from being accomplished. The live-stock industry knows that they were not accomplished, the live-stock sanitary officials know that they were not accomplished, and the very records that rise up like the ghost of Banquo bear testimony to the fact that they were not successful. The protests, the charges, the recriminations that were made by State against State, by man against man, bear testimony to the fact that the ideals proposed in such laws were not realized. The shipments

of tuberculous cattle on certificates issued in various parts of the United States alleging them to have been tested and found free from the disease are notorious; then, the less they are discussed the better.

The bare regulation requiring a tuberculin test of cattle for interstate movement was found inadequate in many instances, and a number of the States inaugurated additional restrictions to safeguard their cattle industry. Some States quarantined absolutely against other States, and again regulations were issued that tuberculin tests should be made only by certain specific persons or organizations.

The outcome of these many regulations created a very strong resentment on the part of the live-stock owners, many of whom were largely responsible for the approaching chaotic condition. Many of the States now require a retest upon all cattle introduced from other States for dairy and breeding purposes. This plan—while we must admit that it works a considerable hardship upon the purchaser of cattle—has proved to be one of the greatest stimulants for the eradication of tuberculosis that has been developed. Of primary importance in the eradication of tuberculosis was the checking of the movement of diseased animals from State to State. Manifestly, it would have been of little use to undertake to clean up an area if diseased animals were permitted to be introduced into that section. I do not undertake to maintain that the interstate movement of diseased animals is entirely prevented at this time; but it is a fact that a very large percentage of tuberculous animals that heretofore were moved interstate are now denied movement interstate, and they are not being shipped East and West and North and South as they were a few years ago. The live-stock owner realizes now more than ever that the prospective purchaser of cattle can not be humbugged: he is seeking animals to augment his herd *from herds whose health is known.*

At this time there are in the neighborhood of 400 State and Federal employes engaged full time in the eradication of tuberculosis. To these veterinarians, many of whom, if not all, are members of this Association, much credit is justly due. They who are engaged in the field work, actually test the cattle, come in contact with the owners and managers of herds and their families, are duty bound to perform tasks that are not always entirely pleasant, and unfortunately in many instances are obliged to render this public service for a compensation at a prewar rate or at a compensation far too small. An abundance of proof that these veterinarians have done their work in a very creditable manner has reached the Bureau

of Animal Industry, and this Association can feel gratified that the veterinarians engaged in public work on tuberculosis eradication have conducted, and will continue to conduct, their work in such a thorough and able manner. These forces are being gradually increased from month to month, and it is not without the realm of reason to anticipate that within a few years there will be more than a thousand employees devoting their entire time to the control of this great plague.

Can satisfactory progress be made with such combatant army of veterinarians? I say, most decisively, "No." We can clean up hundreds of herds in every State; we can clean up tens of counties throughout the United States; but there are tens of thousands of herds to be cleaned up and thousands of counties to be freed of tuberculosis before we can lay any claim to the grand title of the subject of this paper. Our forces now are and most necessarily would always be absolutely inadequate under the present plan of operation; that is, the employment only of official veterinarians in this work.

But does the present plan represent *all* the ideas and conceptions of the necessity for conducting this campaign? It does not. It was never contemplated that satisfactory progress could be made in the eradication of tuberculosis by the employment of only State and Federal officials whose entire time was devoted to the work of the respective Governments by which they are employed. The scope of this work—its proportions—were duly recognized at the time the work was launched. Those in charge of the work recognized from the first the tremendous task undertaken, and they well understood that if satisfactory progress was to be made every available competent person in the United States who could lend assistance to the campaign must necessarily be enlisted as a cöoperating force so that satisfactory progress might be made.

You have heard, perhaps, as we all have heard, that this tuberculosis eradication work was "depriving some veterinarians of their bread and butter." In my mind there is a serious doubt whether I should speak such a phrase; and to a discreet mind, when doubt arises, the subject of the doubt should be dismissed and not uttered. But this claim has been oft repeated, less often by practicing veterinarians than by would-be conservators of the perquisites of the private veterinarians—those intense, philanthropic individuals who are eternally vigilant to protect others from the wrath and inquisitions of an omnipresent evil; those valiant crusaders who with true

chivalric spirit are searching everlastingly as Don Quixote was for opportunities to demonstrate their altruistic and indomitable courage and determination to right imaginary wrongs.

No State has any license or desire to do the private veterinarian an injury, and far be it from the thought of the officials of the Bureau of Animal Industry to work any hardship upon them. The Bureau believes that the campaign for tuberculosis eradication that is now in progress will do more to improve the practice of the private veterinarians of the United States than any other work ever inaugurated, with the possible exception of the control of hog cholera. The private veterinarian must and will play a very important part in this campaign, and it was intended from the very beginning of the work that in time he should be brought into active cooperation. As a true and substantial manifestation of the conception the Bureau has had of the part to be played by the private veterinarian, you are referred to the article on tuberculosis eradication read by the speaker at the meeting of the United States Live Stock Sanitary Association held in Chicago in December, 1918. A plan was then outlined for turning over to the private veterinarian accredited herds which had officially been found free of tuberculosis. This plan will be discussed at greater length at the coming meeting of the above-mentioned association and concrete suggestions made for linking up the private veterinarians with the accredited herds of the United States.

Regulation 7, the first Bureau regulation requiring the application of the tuberculin test for cattle shipped interstate, provides that practically all the testing shall be done by private veterinarians who have demonstrated that they are capable of making tests, and at this time upward of 6,000 private veterinarians are upon the list and have been furnished certificates by the Bureau to test cattle with tuberculin under that regulation. Where in all the annals of veterinary medicine has a more extensive, a more comprehensive and a more practical demonstration of the desire of enlisting the private veterinarians to supplement the work of official veterinary organizations charged with the responsibility of controlling and eradicating infectious diseases ever been consummated? The Bureau has endeavored in that way to enlist the services of every qualified veterinarian in America in the campaign of tuberculosis eradication. It was not a secondary thought that produced this existing plan. It was conceived at the outset and carried into execution at the most propitious moment.

Some few people have conceived the idea that the State veterinarians and the Bureau work a gross injustice upon them when in the accrediated-herd plan they provided that tests should be made only by official employees. The error in so construing the preparation of that plan is that anybody designedly left out the private veterinarian. The accredited-herd plan is the outgrowth of a joint committee representing the purebred cattle associations of America and the United States Live Stock Sanitary Association. This committee was made up of ten members, five representing the purebred cattle club breeders and five representing the association. They met and discussed the plan and submitted a report which was adopted by the sanitary association.

Provision 1 of the plan states that a tuberculosis-free accredited herd is one which is tuberculin tested by the subcutaneous method or any other test approved by the Bureau of Animal Industry under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of a State in which coöperative tuberculosis-eradication work is conducted jointly by the United States Department of Agriculture and the State. This paragraph was unanimously adopted both by the joint committee and the sanitary association. In my judgment it is a wise provision. I do not think that there would be any way to destroy and cast into ignominious oblivion the accredited-herd plan in any quicker way than to permit herds to become accredited upon a test made by every individual, private practicing veterinarian in the United States—and no veterinarian has any keener sense of the honor and intergrity of the profession as a whole than the speaker. I make no apologies for the sentiment expressed, and accept no second position in striving to cast honor upon the profession of which I feel myself one of the most humble members.

To place the accredited-herd plan on the basis of a test by every veterinarian would be putting it in the same position as the interstate movement of cattle has been for ten years. Immediately there would spring up in practically every State the skepticism that has existed for years as to the reliability of the test—and where would the accredited herds be, if in one State there were a hundred herds upon the list that were absolutely ignored in ten other States? If State A had 100 herds and State B had 100 prospective purchasers of purebred cattle, but State B had no confidence in the reliability of the accredited herds in State A, what would it avail that State to have an accredited-herd list? Would it not be absolutely upon

the same basis as the interstate movement of cattle has been for ten years? And would not these various States say, "We do not accept accredited herds from State A or State D or State L? We do accept accredited herds from State C and State K under certain conditions and restrictions and interpretations. They may come into the State, provided we retest them in 60 days." Would that be an accredited-herd plan that you would be proud of, or that any State would take interest in, or any legislature appropriate money to maintain, or any breeder—any reliable and responsible breeder—take any pride in being a member of?

In contrast to that condition, which I think would exist if herds were accredited on the same basis as cattle were tested for interstate shipment for many years, is our accredited-herd system today containing more than 1,000 herds and representing many thousands of cattle. After having the official approval of the United States Department of Agriculture and of every sovereign State in America an accredited herd may move from one State into another State now at any time the owner desires to move it or any member of it, without any additional tuberculin test. Furthermore, a member of an accredited herd or the entire herd itself may move from any State in the United States into the Dominion of Canada or the Argentine Republic or the Republic of Chile, and I dare say to every country in the world that will accept our cattle, without any additional tuberculin test. These herds are tested annually, and those that are accredited receive a certificate from the State and the United States Department of Agriculture which the owner may use to tell the world that, so far as human ingenuity and the best biological agencies that have ever been found can detect the presence of tuberculosis, his herd is free of that disease.

Is there a person within the hearing of my voice that can find any reasonable complaint with a plan that can pick out of a chaotic condition the cattle industry of America and, within a period of two years, place it upon a pedestal that can withstand the darts of criticism? Can any person reasonably object to the accredited-herd plan that the live-stock owners of America have indorsed and that practically every purebred association in America has gone on record by instructing and urging its members to place their herds on such list at the earliest possible date? It is a matter of great pride that the speaker is so fortunate as to be linked up with a work that has so much worth behind it that the breeders of America claim it as the greatest step ever undertaken in the control of tuberculosis.

Shall the private veterinarian take a part in accredited-herd listing? Yes; he shall take a part equal to any person now engaged in that work, provided he demonstrates that he is capable of doing the work, provided he demonstrates that he does the work the same as those engaged in it, and provided he does it in a businesslike way at the time it is intended that it shall be done. We have some ideas relative to the part he shall play in this campaign, but inasmuch as this subject is going to be discussed thoroughly at the meeting of the United States Live Stock Sanitary Association which will be attended by many of you, I will not undertake to enlarge upon it at this time. Suffice it to say, however, that so far as the Bureau of Animal Industry is concerned it will strive for the adoption of a plan which will enlist the services of the private veterinarians in a way that will be satisfactory to all concerned and at the same time will safeguard the plan from as many errors as possible.

The live-stock world cares little whether tuberculosis is eradicated by private veterinarians or officials of the States and Federal Government, but it is concerned in the conservation of its resources and it does not propose to permit tuberculosis to spread until practically all the herds, bovine and porcine, are infected. It has called the halt on the great white plague so far as it affects the cattle and swine. It says, we believe, that when tuberculosis has advanced at the rate of 1 per cent per annum among the swine of America for the last 10 years, with prospects that it will continue to spread at an increasing rate unless checked, we should be traitors to the nation if we did not make every endeavor to check the ravages of the disease at this time. It further says to the State live-stock sanitary officials and to the United States Department of Agriculture: "Your organizations are charged with the responsibility for the control and eradication of infectious diseases of live stock, and we hold you accountable for the progress that tuberculosis has made and the prospects of its further advancement. The burden is upon your organizations to check its spread, and we, with our organization, and through our individual efforts, are going to hold you strictly to account. If tuberculosis is an eradicable disease, you must eradicate it!"

It strikes me that if we don't eradicate it, someone else will get the job; through some other organizations, State and Federal, an effort will be made to exterminate tuberculosis. We have a tolerant people in this nation—easy-going, good-natured, willing to overlook mistakes, sympathetic and tolerant—but all these virtues have a limitation, and this same people when they make their minds up to do a

thing never fail! They have made up their minds to eradicate tuberculosis, and they have given us the great privilege which the veterinary profession of America deserves to be entrusted with because it has demonstrated on every occasion that has arisen that it can be relied upon to fulfill its mission—it has, by its deeds, won the everlasting respect of the live-stock industry, its employer; and what greater compensation and honor could it obtain than the commendation, "Well done, thou good and faithful servant"?

THE ACCREDITED-HERD PLAN

The accredited-herd plan was unanimously adopted by the United States Live Stock Sanitary Association and by representatives of the purebred cattle-breeders' associations, and approved December 23, 1917, by the United States Bureau of Animal Industry. Today it is less than 2 years old. It is adopted by every State and Territory of this nation. It is in operation in 45 States. The demands for the work far exceed the forces available to take care of it. In August, 1918, List No. 1 of accredited herds was printed by the Department of Agriculture and 50,000 copies were distributed throughout the United States. On March 31, 1919, the books were closed so that List No. 2 would contain all the herds accredited up to that date. List No. 2, of which 100,000 copies were printed and have been distributed, shows that then there were 782 accredited herds and 6,535 herds which had passed one successful tuberculin test without reactors in preparation for certification. Since that date these figures have been largely augmented.

The accredited-herd plan has been indorsed by every purebred cattle breeding association in the United States and has been approved by practically every agricultural and live-stock journal of America. The plan is not perfect, but it is reliable. It has withstood the test of time, and to day it stands approved. That it can be improved here and there, there is no gainsaying; but the plan, if followed, will be the beacon light to guide the cattle industry of America in the eradication of tuberculosis. From time to time accredited herds will be found to contain tuberculous animals, and some owners will be disappointed and may question its success, as some individuals question the skill of the surgeon, or the observations of the astronomer, or the reckoning of the mariner, or the astuteness of the statesman, or the ability of the lawyer, or the diagnosis of the physician, or the wisdom of the philosopher, or the accuracy of the scientist. The accredited-herd plan will make errors

the same as flesh and blood and every plan devised by man. As the seed fails to germinate and the soil fails to function, and the tides overreach their normal ebb and flow, so will the accredited-herd plan fail to reach the acme of perfection; but if we veterinarians fulfill all our obligations, if we render to the accredited-herd plan and to the industry, with the health of which we are charged and have sworn to protect, the best services which we are capable of rendering, the accredited-herd plan will have so few errors charged against it that it will take its place among the human instruments devised by man for the perfection of man's worldly goods.

If we cooperate with the same earnestness that the veterinary profession has cooperated in the extermination of other infectious diseases of the United States, the accredited-herd plan will have done more to raise the veterinary profession in the estimation of the live-stock world and in the estimation of this nation and the nations of the world than any work it has ever undertaken. American veterinarians have assumed a great responsibility in undertaking to eradicate tuberculosis. They do it, not with the idea that it is an easy task, but that it is the most gigantic work ever assumed by them. Their aim is to eradicate tuberculosis from every purebred herd in America so that it may be on the accredited-herd list.

In twenty years from now what will be the status of a herd that is not accredited? Will it be necessary to have a discredited-herd list? The accredited-herd plan is worthy of the support of the individual veterinarian, of the county association, of the State veterinary association, and of the greatest veterinary association of the world—The American Veterinary Medical Association.

GUIDANCE OF A. V. M. A. IN TUBERCULOSIS ERADICATION CAMPAIGN

This association at the annual meeting in Chicago, 1909, appointed the commission known as the International Commission on the Control of Bovine Tuberculosis, the personnel of which was as follows:

Dr. J. G. Rutherford, Ottawa, Canada, Chairman.
Dr. M. H. Reynolds, St. Paul, Minn., Secretary.
Senator W. C. Edwards, Ottawa, Canada.
Mr. J. J. Ferguson, Chicago, Ill.
Mr. J. W. Flavelle, Toronto, Canada.
Hon. W. D. Hoard, Fort Atkinson, Wis.
Dr. C. A. Hodgetts, Toronto, Canada.
Dr. J. N. Hurty, Indianapolis, Ind.
Dr. J. R. Mohler, Washington, D. C.

Dr. V. A. Moore, Ithaca, N. Y.
Dr. M. P. Ravenel, Madison, Wis.
Dr. E. C. Schroeder, Washington, D. C.
Mr. T. W. Tomlinson, Denver, Colo.
Dr. F. Torrance, Winnipeg, Canada.

This commission held four meetings—at Buffalo, N. Y., December 13 and 14, 1909; Detroit, Mich., March 1 and 2, 1910; Ottawa, Canada, May 19, 20 and 21, 1910; Madison, Wis., June 27 and 28, 1910. An exhaustive study was made of the tuberculosis problem at that time, and in a report submitted by the commission at the conclusion of its investigation all of the phases of the work were succinctly covered, and a study of this report can not help but inspire one engaged in the work at this time.

INFECTED AREA VERSUS FREE AREA

When an area is freed of tuberculosis how shall we protect it against the invasion of diseased animals?

It must be admitted that, if an area is freed of tuberculosis, it would avail very little to the residents of that area unless some means were devised for preventing the introduction of tuberculous animals. If a county such as Island County in the State of Washington, or the District of Columbia, wherein our Capitol is located, eradicates tuberculosis from its cattle, is it asking too much to put such territory in a little different status from counties or States wherein it is known that the disease exists to a considerable degree? If the State of Idaho or any other State is freed of bovine tuberculosis, should it be kept in the same status as another State wherein tuberculosis exists among 30 per cent of the cattle?

Today we have a Federal regulation requiring the tuberculin testing of cattle for interstate shipment. Would it be justice to the live-stock owners of a tuberculosis-free Idaho, to the live-stock owners of Island County, Washington, or to the live-stock owners of the District of Columbia, to require that their cattle shall be tuberculin tested before their cattle will be allowed to move interstate, when no tuberculosis exists within their confines? It is true that those territories—the county, the State and the District referred to—are comparatively small units; but there are other States representing more than one-half of the area of this country that are comparatively free from tuberculosis, and it is reasonable to expect that within the next 10 years those States will be practically freed from the disease. Should we not be looking forward to the time

when this area should be classed as free, so that the movement of cattle interstate might be facilitated without any tuberculin test? The State of Georgia now proposes to eradicate what little tuberculosis exists in the three northwestern counties of the State. What will it profit the owners of those three counties after they come through with the work and have exterminated the disease, if they are required to have their cattle tested the same as cattle tested in States wherein the disease exists extensively? Starting at the Potomac River, going south to the Gulf of Mexico, and west to the California line, and going west from the Washington Monument, all that territory south of the Ohio River is comparatively free from tuberculosis. In addition to that, take the States of Oregon, Washington, Utah, Idaho, Montana, North Dakota, Wyoming, and Nevada, and possibly some that are not mentioned; they are comparatively free from tuberculosis.

In all that territory and within all the States enumerated tuberculosis exists among the dairy herds recently established or herds of longer standing that were established with the seed foundation imported from other States. That is a very serious charge—that those States were free from tuberculosis until animals were imported into them from other States! The grounds upon which that statement is predicated are the experience of tuberculin testing all of the herds in that territory for a period of two years and the more extensive testing of herds in those respective States under the supervision of the State veterinarians. You can go into the native herds where no importations have been made and where the animals have not come into contact with herds containing recent importations, and no tuberculosis is found. Can any person question for one moment the right and duty of a State official having such conditions to employ every possible restriction and regulation to keep the disease out of his State? Why, he has the unanimous support of the live-stock industry and he has the resources, the entire resources, of his State—physical and fianncial—to back him up in freeing the territory of the disease! What is his reward and the reward of the people going to be when they do get rid of the disease? Shall they be required, whenever they desire to ship an animal interstate, to have it tuberculin tested the same as other States where the disease has obtained a stronghold? Would it not be sufficient for those herds to be annually tested or occasionally tested?—and it will be necessary to test them to be certain that the disease does not exist.

I submit to you the recommendation that as rapidly as territory is freed of tuberculosis it be designated as free territory, and that the movement of cattle from that territory interstate, except cattle under local quarantine, be permitted without restricions so far as uberculosis is concerned. In ten years we should have in the United States an area approaching more than 2,000,000 square miles that will be virtually free of the disease. This will represent, in round numbers, two-thirds of the total area of the United States. This may seem visionary to some, but it is not any more speculative than was the program outlined in 1906 for the eradication of splenetic fever of cattle. You will recall that at that time there was quarantined on account of the existence of the cattle tick more than 700,000 square miles of territory in this country. The plans in operation for the eradication of the tick when the work was inaugurated were the rotation of pastures and the mopping of infested cattle with the grease rag. Both methods were later supplanted by a more modern and approved method, namely, the dipping vat, which is now in universal use in the extermination of that disease. The point I wish to make, however, is that in 1906 it was known that the cattle tick could be eradicated, and the Bureau of Animal Industry proclaimed that it was engaged in a campaign to exterminate that parasite from more than 700,000 square miles of territory within the Union. The end of that campaign is in sight, as it is contemplated that the work will be practically completed well within five years from this date.

I grant that it is very much easier to exterminate the tick from an infested area than to eradicate tuberculosis from a herd; but we have knowledge and confidence born of experience that the latter disease can be exterminated from a herd, and that hundreds of herds have been freed of tuberculosis. Accepting those facts, as we are compelled to, we have confidence that wherever and whenever an owner and the manager and other persons in care of a tuberculous herd earnestly determine to rid it of the disease and put into practice the same methods that have been tried and proved adequate, they will eventually succeed. It will be a difficult task, but the effort will be crowned by victory when it is determinedly practiced.

The responsibility for eradicating tuberculosis from individual herds rests upon the owners and persons in care of such herds. If they approach the problem without decision, without determination, and without carrying out all the practices that are absolutely essen-

tial for success, they will fail. If they leave in the herds tuberculous animals that are compromises of their own consciences, if they trifle with the results of the tuberculin test or any other reliable method of detecting the disease, they will fail. In every State today owners may obtain full instructions for eradicating tuberculosis.

The campaign is just in its infancy. No person can forecast the date when this great work will be completed, and it is unnecessary to make any estimate of how long it will take. It may be 50 years or a century before the end is in sight; but what is a century if, at the end of that brief space of time as compared with the ages that have passed and the time that is to come, the job is finished? If we pursue this campaign and it develops as it has progressed in the last two years—and we are working hand in hand, breeder with breeder, and veterinarian with veterianarian—there need be no apprehension as to the ultimate outcome, and as this generation relinquishes its responsibilities and they are assumed by their successors we need have no qualms of conscience as to the estimate they will have of our ability and sincerity and temerity to have engaged in this enterprise; and what richer heritage can we bestow upon our successors than the preservation of the live-stock of this Nation which has been entrusted into the care of the breeders and the veterinarians during their reign upon this earth! Therefore, let us strive to be true to ourselves and show by our deeds that we were worthy of the trust reposed in us!

Dr. R. W. Hickman, while sitting in the tenth decennial meeting of the United States Pharmacopœial Convention, noted as interesting coincidences that this is likewise the year of the one-hundredth session of the Philadelphia College of Pharmacy, of which he is an alumnus, and that the class with which he graduated, that of 1870-71, was the semi-centennial class of that institution. Sic tempus fugit.

Dr. Charles L. Colton, Deputy Commissioner of Agriculture of Connecticut, was a recent visitor to Washington in the interest of animal-disease control in his State.

STUDIES ON ANTHELMINTICS. IX—SANTONIN

By MAURICE C. HALL,

Parasitologist,[1] *Research Laboratory, Parke, Davis & Co., Detroit, Mich.*

IN previous publications the writer has pointed out that since santonin differs from the great majority of anthelmintics in that it is not a gastro-intestinal irritant, it is especially qualified for use where repeated doses of an anthelmintic are indicated. Moreover, in the amounts in which santonin is commonly employed, repeated doses are much more effective than single doses, even where the latter exceed the limits of the commonly used therapeutic dose. Of the worms in the dog, hookworms and whipworms are the ones which commonly require repeated doses for their removal. Of these, the hookworms are not amenable to treatment with santonin, a fact which is generally known and which the writer has confirmed experimentally. Whipworms, however, can be removed by santonin, and in the writer's opinion santonin finds its especial indication in the treatment of whipworm infestations. In an earlier paper (Hall, 1917) the writer has stated the case thus:

"To secure results from santonin it is necessary to repeat the dose a number of times. It may be given [for ascarids], 1 grain of santonin and 1 grain of calomel a day, as often as necessary, having due regard for its effect on the patient, and especially on the kidneys, and in some instances this method might be preferred to the administration of a single dose of oil of chenopodium, but for certainty of results and saving of time, chenopodium is the preferred treatment. The treatment just outlined, 1 grain of santonin and calomel daily over long periods, is a very effective treatment for the removal of whipworms, as only an occasional dose of anthelmintic enters the cecum, where these worms are lodged, and treatment must be repeated to insure removal of these worms. Santonin is of no value against hookworms, even in oft-repeated doses."

The following experiments in administering santonin to dogs illustrate the points just mentioned.

In single dose:

Dog No. 178, weighing 7.75 kilos (17 pounds), was given santonin at the rate of half a grain per pound of live weight, or 8.5 grains. This is the dose rate used by some veterinarians and is

[1] Resigned March 27, 1919.

very much higher than that given by Winslow (1 to 3 grains). The dog received an equal amount of calomel. This dog passed either 57 or 20 ascarids, probably 20 (the feces of this dog and another were confused when both animals escaped from their cages). On postmortem examination this animal had 12 ascarids and 1 *Dipylidium*. This large dose of santonin was therefore 62.5 per cent (or 83 per cent) effective against ascarids and 0 per cent effective against *Dipylidium*.

In repeated doses:[1]

Dog No. 110, weighing 13.6 kilos, was given a grain of calomel and a grain of santonin daily for a total of 6 grains of each in 7 days. The dog passed no worms and was found to have 2 whipworms postmortem. Six doses were insufficient in this case to insure entry of the drug into the cecum, and the treatment was 0 per cent effective against whipworm.

Dog No. 111, weighing 10 kilos, was given the same treatment and for the same length of time as the preceding dog, No. 110. This dog passed 33 ascarids in the 6 days following the first dose, and on postmortem was found to have 1 ascarid and 1 whipworm. Six doses were insufficient to insure entry of the drug into the cecum or the removal of all ascarids present. The treatment was 97 per cent effective against ascarids and 0 per cent effective against whipworms.

Dog No. 108, weighing 9.5 kilos, was given the same treatment, 1 grain each of santonin and calomel daily, for a total of 12 grains in 14 days. On the second day after beginning treatment the dog passed the thick posterior portion of a whipworm and on the third day passed the thin anterior end which is habitually found sewed into the mucosa, showing that following the toxic effect on the worm peristalsis had apparently torn the free portion of the dead worm from the attached portion, the attached portion subsequently becoming released and passing out a day later. On postmortem the dog was found free from worms, the treatment being at an early stage 100 per cent effective against whipworms.

Dog No. 71, weighing 12 kilos, was given daily doses of 1 grain each of santonin and calomel, approximately 2 days out of every 3, for a total of 61 grains in 3 months. After 7 doses the dog passed 1 whipworm. Postmortem the dog had 32 hookworms and 4 *Dipylidium*. The treatment was, therefore, 100 per cent effective against whipworms and 0 per cent effective against hookworms and

[1] This set of protocols was published by Hall (1919).

Dipylidium. The fact that over a dram of santonin was without effect on hookworms or tapeworms is rather conclusive evidence as to its entire lack of efficacy against these worms.

Dog No. 120, weighing 13.5 kilos, was given 5 grains each of santonin and calomel daily for a total of 25 grains in 6 days. This dose invariably caused vomiting in the course of a half hour, so the daily dose was cut to 2.5 to 3.5 grains and 9 such doses given in the next 10 days for a total of 25.5 grains. The dog was given a total of 50.5 grains in 16 days, an average of over 3 grains a day. The third day after the first dose the dog passed 14 whipworms and was free from worms postmortem. The treatment was therefore 100 per cent effective against whipworms.

Santonin combined with oil of chenopodium:

Dog No. 306, weighing 13.5 kilos, was given 1 dose of 3 grains each of santonin and calomel, and oil of chenopodium at the rate of 0.1 m. p. k. (mil per kilo). This treatment removed 43 ascarids and left 5 *Dipylidium*. Efficacy against ascarids, 100 per cent; against *Dipylidium*, 0 per cent.

Dog No. 308, weighing 14 kilos, was given 2 grains each of santonin and calomel, and oil of chenopodium at the rate of 0.05 m. p. k. The dog passed 1 ascarid and on postmortem was found to have 1 ascarid left. The treatment was, therefore, only 50 per cent effective against ascarids. This experiment does not indicate any synergistic action from the simultaneous use of santonin and chenopodium. Sollmann's (1918) tests on earthworms in vitro did not indicate that synergistic action is to be expected. As has been stated, santonin does not develop high efficacy in single doses, even in large doses, and gives its best results by what seems to be a cumulative action against such worms as ascarids. As regards chenopodium, the therapeutic dose against ascarids is 0.1 m. p. k.; the dose used here (0.05 m. p. k.) is commonly 100 per cent effective, though not dependably so, as the dose of 0.1 m. p. k. may be said to be.

Dog No. 310, weighing 8 kilos, was given 1 grain each of santonin and calomel, and oil of chenopodium at the rate of 0.05 m. p. k. The dog passed 6 ascarids and had 28 *Dipylidium* postmortem. The treatment was 100 per cent effective against ascarids and 0 per cent effective against *Dipylidium*.

Dog No. 13, weighing 9 kilos, was given 2 grains each of santonin and calomel, 25 minims of oil of chenopodium (almost 0.2 m. p. k.), and 0.1 grain of elaterin. The dog passed 2 ascarids and had 3 *Dipylidium* postmortem. The treatment was 100 per

cent effective against ascarids and 0 per cent effective against *Dipylidium*.

An examination of the foregoing protocols indicates that in single dose santonin fails to show a very high anthelmintic value against ascarids, even when used in doses of a half grain per pound of live weight. The protocols show that in repeated doses it manifests what appears to be a cumulative action against ascarids, gradually clearing them out. Repeated daily doses of 1 grain each of santonin and calomel will ultimately clear out whipworms. This may not be accomplished in the course of a week in some cases, and it would perhaps be advisable to give this treatment for 1 week, suspend treatment for a week, and then repeat for a week. The assurance of a cure would have to be obtained from fecal examinations for eggs; generally speaking, the diagnosis of whipworm infestation would be made in the same way. The protocols suggest that a successful termination to treatment for whipworms by repeated doses might be hastened by giving larger doses of santonin daily. Whether one cared to give the larger doses would depend partly on his judgment as to whether it was safe. So far, all our experience with santonin has indicated that it is quite a safe drug for dogs in the doses commonly employed; we have yet to see a dog killed with the drug, and the protocols show that the doses employed are in some instances rather large when compared with those commonly advocated for dogs.

Winslow (1913) says: "While 5 to 6 grains induce symptoms of poisoning in dogs, ½ to 1 dram has often failed to produce a fatal result. * * * Santonin is very slowly absorbed from the intestines and is oxidized in the tissues and eliminated as oxysantonins."

The protocols show that santonin is entirely without value against hookworms and *Dipylidium*, the use of over a dram of santonin in 3 months having no effect on hookworms and *Dipylidium* in the case of dog No. 71, and the use of half a grain per pound having no effect on *Dipylidium* in the case of dog No. 178.

In passing, it may be noted that Hall and Foster (1918) found that santonin in the 1- to 3-grain doses was only 24 per cent effective against ascarids, the efficacy rising when two doses were given instead of one. They likewise found santonin, under these conditions, entirely ineffective against hookworms and tapeworms, and only 7 per cent effective against whipworms. These findings are in agreement with those published here.

In connection with the administration of large amounts of san-

tonin, it is interesting to note that in the case of dog No. 71, which received a little over a dram in the course of 3 months, the animal's weight dropped from 12 kilos to 10 kilos in 1 month; to 9 kilos in 7 weeks; and rose slightly, to 9⅛ kilos, 1 week before the animal was killed. This dog's eyes were very luminous, and the effect was heightened by the fact that the hair came out over a fairly wide area around the eyes. (See fig. 1.) There was also a pronounced loss of hair along the ventral surface of the neck and abdomen and in the axillary and inguinal regions. Sores formed around the nose. The dog was very active. In spite of the large amount of santonin administered, the digestive tract was normal except for a few small inflamed areas in the jejunum, the drug manifesting its customary lack of irritant qualities. Dog No. 120, which received 50.5 grains of santonin in 17 days, had a normal digestive tract.

Fig. 1.—Dog No. 71, showing loss of hair around eyes and in axillary region.

Under the initials S. A. K. (1919), a writer has recently raised the question as to the advisability of using santonin in human cases where fever is present, as follows:

"I have met with * * * a variety of cases with high fever and history of vomiting or having passed a worm or two per rectum. I want to know whether santonin can be given when the fever is over 102 degrees. If not, what else should be tried? I used santonin in fever with fatal results. The fever does not subside for days together with any remedies. In such cases, knowing as I do that the cases are complicated with worms, I am at a loss to know how to give relief to my patients."

I have elsewhere expressed the opinion that febrile conditions are contraindications to anthelmintic treatment. There might be cases where it would be advisable to use anthelmintic measures during

the course of a febrile disease, but I doubt it. Febrile conditions indicate the presence of toxins, and the administration of additional toxic material in the shape of anthelmintics would commonly be unwarranted. As regards the effect of the santonin on the temperature of the patient, our experiments show the following results:

Dog 71 started with an initial temperature of 100.8° F.; after a slight rise, this began falling and went to 99.6° in a week; there followed a gradual and irregular rise, reaching a maximum of 102.4° in 3 weeks; following a gradual 4-day drop to a little over 100°, the temperature jumped to over 102° and gradually fell to a minimum of 99.1° 5 weeks after the beginning of treatment; thereafter the temperature maintained a range between 100° and 101° almost all the rest of the time.

The slight initial rise in temperature following administration of santonin is duplicated in the case of 4 out of 5 remaining dogs. Following this there is a drop and then the temperature fluctuates, but in these experiments the temperature rarely deviated from the normal range, and then the deviation was small as a rule. Santonin apparently has but little effect on the temperature of the normal animal. Dog No. 71 showed little deviation from the range of 99.5° to 102.2° given by Malkmus as the normal for dogs, and dog No. 112 did not even reach these limits of deviation; these were the dogs receiving over 60 and over 50 grains of santonin, respectively.

In passing, the following facts from the *Chemist and Druggist* are of interest:

Some twelve years ago Germany acquired a monopoly of the santonin industry in Turkestan, and Hamburg was a center of the distributing trade. During the war exportation from Russia has been in the hands of one firm. There is only one factory producing santonin, and that is near Tashkent in Russian Turkestan. It now develops that for several years past no wormseed has been collected and that for 15 months manufacture has practically ceased. This is attributed to an acute famine which has prevailed, lack of labor, and insufficient crops of wormseed. There has also been a shortage of hydrochloric acid, which is used in the process of manufacture. These factors have caused a considerable shortage in santonin, and even after the war is finished and communications reëstablished, it will require one or two years before the Turkestan factory is able to resume its normal annual output of 8,000 to 10,000 kilos.

REFERENCES

HALL, MAURICE C. 1917. Anthelmintic treatment for nematode infestations in dogs. J. Am. Vet. M. Assn., v. 5 (3), Dec., pp. 342-345.

1919. Practical methods of treatment for worm infestations. J. Am. Vet. M. Assn., v. 8 (1), April, pp. 24-45, 1 fig.

HALL, MAURICE C.; & WINTHROP D. FOSTER. 1918. Efficacy of some anthelmintics. J. Agric. Research, v. 12 (7), Feb. 18, pp. 397-447.

S. A. K. 1919. Does santonin maintain a fever? Med. Council. v. 24 (2), Feb., p. 124. (Reprint from Practical Med., Delhi, India.)

SOLLMANN, TORALD. 1918. Anthelmintics: Their efficiency as tested on earthworms. J. Phar. & Exp. Therap., v. 12 (3), Oct., pp. 129-170.

WINSLOW, KENELM. [1913]. Veterinary materia medica and therapeutics. 7 ed. revised, 781 pp., New York.

IN a recent communication from Dr. G. A. Roberts of Sao Paulo, Brazil, he states that the veterinary profession in Brazil at present is at a very low standard. There are very few qualified veterinarians but quite a few posing as such. The graduates are largely from France and Italy. Several are from a "poor excuse" veterinary college at Rio de Janeiro and others from a somewhat better school at Pernambuco. The three-year course in veterinary medicine at the Instituto de Veterinaria with which Dr. Roberts is connected began March 4, 1920, and the buildings were "dedicated" with inaugural exercises April 19th. There are 20 students in the first year.

The many friends and colleagues of Dr. J. E. Aghion Bey will be glad to learn that he has recently been promoted to Chief Veterinary Inspector of the Egyptian Domains, with headquarters at Sakha, Egypt.

Dr. Tage Ellinger, of the University of Copenhagen, is now visiting the United States studying the animal industry and livestock problems of this country. He reports the good health of Prof. Bang and his continued interest in the veterinary profession of America.

SOME CHANGES IN THE IRREGULAR BONES OF CATTLE[1]

By L. ENOS DAY, *Chicago, Ill.*

VETERINARY inspectors on the cattle-killing floors in Chicago and at other stations have for several years called my attention to a peculiar darkened condition of the osseous structure in cattle, accompanied by a softening of the centers of the irregular bones, more particularly the vertebræ and the bones of the sternum. This condition in the bones has been designated by some as hyperplasia of the bone marrow.

This disease is found in cattle of both sexes and of all ages. At one time we were led to believe that it affected only animals that were in excellent flesh, from 1½ to 2½ years of age, and it seemed to be confined to steers. Later we observed the disease in aged animals of both sexes that were quite thin in flesh. No statistics are available giving the exact per cent of cases found, but it is apparently quite low, probably one in many thousands slaughtered. At one time we thought that the disease might be confined to a certain locality, but we now find that it is liable to be found in cattle from any locality in the Mississippi Basin. I have never seen such a case, although it may exist, in range cattle. All of the cases which I have observed so far have successfully passed the antemortem inspection and were found on postmortem. I am therefore unable to give the symptoms, if any there be, shown by the animals, or to give any results of examination of the blood or secretions during life.

The postmortem lesions might well be divided into two stages. namely, slight and advanced cases. In the slight cases the changes are confined to the darkening of the cancellated structure of the vertebræ, sternebræ and ribs, with a slight softening of their centers. In the more advanced cases the changes in the bones are more pronounced and other organs are involved.

The postmortem findings in advanced cases are as follows: The alimentary tract appears normal, as are also the contents of the thoracic cavity. The spleen is usually normal in appearance or only slightly enlarged. The lymph nodes, especially those of the abdominal cavity, are slightly enlarged and edematous, with a dark

[1] Paper presented at the fifty-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

yellow pigment deposited through the central portion. In some instances small petechiæ are seen in the periphery. The kidneys are swollen and of a mahogany-brown color. The skeletal muscles are also darker than normal in color.

The entire osseous system is affected. The most prominent change is in the irregular bones; the vertebræ, sternebræ and ribs being those affected mostly. The latter are not changed in size or shape and are mahogany brown to nearly reddish black in color. The cancellated structures in the centers of the bodies of the vertebræ, sternebræ and ribs are broken down, soft, and easily cut with a knife. I have observed some cases in which the centers of these bones have become so soft that the contents would almost run out by the effect of gravity when turned upside down.

The long bones are normal in shape but are yellowish brown in color. The cancellated structure is deep red in color and softened. The marrow in advanced cases shows softening, with small areas of petechial hemorrhages.

The miscropical picture of the cancellated structure of the irregular bones is quite striking. There is a marked absence of the bone plates, which seems to be the result of destruction of the connective tissue framework and absorption of the lime salts. The marrow spaces are greatly engorged with white blood cells of various kinds, mononuclear leucocytes and lymphocytes being the chief invaders. There is also an increase in the myeloplax. Scattered through the marrow are numerous pigment granules which appear in clumps two or three times larger than a large mononuclear leucocyte. This pigment appears to be a bile pigment.

The kidneys and lymph nodes contain a large amount of yellowish-brown pigment, which is apparently bile pigment. The kidneys also contain large quantities of yellowish-brown pigment which is lodged in the epithelial cells lining the convoluted tubules, while in the lymph nodes it is found evenly distributed through the node. In some of the cases I have found many of the blood vessels of the kidney engorged with leucocytes, suggestive of leukemia.

Thinking that possibly this condition might be of an infectious nature, I have repeatedly injected guinea pigs and rabbits both subcutaneously and intraperitoneally, with negative results. I have also inoculated many tubes containing the ordinary culture media with the hope of getting a growth, but also with negative results. Assuming that possibly guinea pigs and rabbits might be refractory and that the disease might be transmissible in cattle from one to another, I injected two calves.

Calf No. 1, female, a grade Holstein, about 5 months old and in a good healthy condition, was injected intravenously into the ear vein with 2 c.c. of a suspension of broken-down bone tissue in normal salt solution. This animal remained in good health and was slaughtered about 2 months afterwards. On postmortem no lesions of disease were found.

Calf No. 2, female, aged about 4 months, grade Shorthorn, in good growing condition, was injected June 30, 1917, with 2 c.c. of a suspension of broken-down bone marrow in normal salt solution. On July 12 a differential blood count was made, with the following findings: Small mononuclear leucocytes, 17 per cent; large mononuclear leucocytes, 37 per cent; polynuclear leucocytes, 45 per cent; eosinophile cells, 1 per cent. This animal's temperature was taken daily until September 6, the highest temperatures during this time having been 104.2° on July 15, and 140.8° September 1. On all other days it seldom reached 103°, remaining from 102° to 102.8° most of the time. The calf was slaughtered November 16, or about 4½ months after injection, and on postmortem was found normal. During these experimental periods both of the calves grew well and gained in flesh quite rapidly.

Successful Farming in a description of "Bang farms"—which are farms on which provision is made for raising the offspring of well-bred tuberculous cattle—says: "While Federal supervision for Bang farms might not be obligatory, it is advisable to have the State inspector in charge exercise such supervision. When the farm is properly conducted the management should have nothing to fear from this, and it might go a long way toward insuring the success of the project through the allaying of suspicion."

Compulsory testing of whole sections rather than the present hit-and-miss plan of attempting to eradicate tuberculosis was encouraged at a recent meeting of breeders and farmers in Manson, Iowa. There were no details worked out at the meeting as to how they would go about the eradication under the proposed method, but the sentiment was that the present method was not thorough enough to make it worth while. The principal complaint came from the fact that it was easy for the clean herds to come in contact with those that were not clean under the present arrangement.—*Wallaces' Farmer.*

SOME OBSERVATIONS IN GENERAL PRACTICE[1]

By H. E. BENDER, *Lititz, Pa.*

I FEEL that it is necessary to offer an apology for presenting a nondescript paper of this sort. After consenting to contribute something to the program, I waited until the very last minute for something to occur that would be worth while writing about, but as that something has failed to materialize, I will occupy the time allotted to me by referring to some conditions which I have encountered more or less recently. If the methods I am about to describe are homely and commonplace and do not conform to the recognized classical lines of treatment, it should be remembered that I am not urging their adoption but am simply discussing their satisfactory employment in my own work.

TORSION OF THE UTERUS

Of the conditions met with in bovine obstetrics, the one above all others which caused me most difficulty and was treated with least satisfactory results was torsion of the uterus. After going along for a good many years in the regular line of treatment, such as rolling and rotating the patient by means of ropes and using the hand and arm to effect reduction of the torsion, results were far from satisfactory. After having tried every method of which I could think on one of these cases, and being completely exhausted from repeated attempts at reduction, it occurred to me that if the tension could be taken off the uterus it might be possible to untwist the torsion. With that object in view attempts at reduction were renewed, with the result that delivery was finally accomplished. While the method is very simple and may be in common use by many practitioners, a brief description may not be out of place.

We know that by the law of gravitation a falling body travels in a straight line. By applying that principle to the condition before us it is reasonable to assume that if pressure can be taken from the front and sides of the uterus it will have a natural tendency to straighten to at least a certain extent. This can be accomplished by attaching a cross-piece above the hocks of the cow and using a block and tackle to raise the hind quarters of the animal; the internal organs will then fall forward and the lateral and backward pressure on the uterus will be greatly reduced; then the weight of

[1] Paper presented at the thirty-seventh annual meeting of the Pennsylvania State Veterinary Association, Harrisburg, Pa., January 19-20, 1920.

the fetus falling in a straight line causes the uterus to fall in the same general direction. Here is where the work of reduction actually begins. At this stage of the procedure the twist in the vagina is usually sufficiently relaxed to allow, with some difficulty, the introduction of the hand into the uterus. If possible, a rope should then be attached to both legs of whichever end of the fetus is presented. Assistants should pull on the ropes and attempt to withdraw the legs so far that they may be grasped with the hands. The assistants should pull and attempt to rotate the fetus at the same time. This can usually be done by turning leg over leg, and by thus rotating the fetus a rotation of the uterus occurs as well.

At this point attention should be called to the two most important factors in the whole procedure. First, when elevating the hind quarters of the cow be sure to have her body inclined in a direction opposite to that of the torsion, for that position will tend to allow unwrapping to be done more easily. The second factor is to be sure to rotate the fetus in a direction opposite to that of the torsion.

In cases of forward presentation it is not unusual to find the head deflected to a lateral position, and this deviation is probably due to the constricted condition of the vagina. In these cases it is usually necessary to use a crotchet in one or both eyes in order to draw the head into its proper position. The ropes on the crotchets can often be used to a decided advantage both for traction on and rotation of the fetus.

When the torsion is sufficiently reduced and the fetus has been partly withdrawn it is not necessary to complete the delivery with the cow in the elevated position. However, that is a matter that can best be left to the judgment of the operator.

Probably many present have been using this method, but for the benefit of any who may not have employed it I will say that it has invariably proved satisfactory for me, and I no longer attempt to reduce what may be called a real difficult torsion in any other way. Slight torsions are not infrequently encountered, but they occasion so little trouble that it is not necessary to touch on them in this paper. While I have no intention of discussing symptoms of torsion, I do believe that careful observation and close association of facts in various cases enables us in many instances, if not to diagnose, to at least suspect torsion even before making a vaginal examination.

PROLAPSUS OF THE UTERUS

Prolapse or eversion of the uterus is a condition which is frequently encountered following closely after parturition, and at

times it puts a real test upon our resourcefulness before we succeed in its proper reposition. While admittedly some eversions are very difficult to treat, yet in general the task of replacing a prolapsed uterus is largely what we make it and does not necessarily call for an exhibition of brute strength. If we make it a rule to go about the work with some general system or plan in mind and remember a few essential facts, the work can surely be made easier and the results as a rule satisfactory.

There are several steps in the routine, all of which have an important bearing on the results. Briefly they are: (1) preparation, (2) reduction and reposition, (3) retention.

The matter of preparation can be passed over very briefly. As a rule by the time we see the patient the uterus is badly soiled with feces, covered with filth and litter, and often considerably bruised. In some instances the placenta is still rather intimately attached to the cotyledons and should be carefully removed if it does not cause excessive hemorrhage. The uterus should be very thoroughly cleansed with warm, mild antiseptic solution freely applied. In addition to this cleansing there are numerous preparations which may be used on the uterus, such as opium, belladonna, alum solutions, etc. Latterly the use of sugar has come into vogue with some veterinarians. Whatever tactics are employed in replacement, if straining is severe, opiates may be administered provided other conditions do not contraindicate their use. Straining may also be lessened by passing a rope over the back and around the chest and twisting it tightly. Grasping the skin above the spine with the hand or pinchers will often cause the animal to lower her back and may help to lessen the straining. In preparing the uterus for replacement a clean cloth should be placed beneath it, and if it is very much congested and swollen it should be gently kneaded or massaged, or it may be wrapped with bandages to reduce the size.

By the term reduction I mean to refer to the passing of the everted uterus into the pelvic cavity, and by reposition is meant the replacing of the uterus into its proper shape and position in the abdominal cavity.

There are a number of methods which can be used in the process of reduction, depending largely upon the severity of the case in hand and also upon the judgment of the obstetrist.

If the cow is standing she should invariably be raised in the hind quarters. This is one of the greatest factors in the work, regardless of the position in which the cow may be found. If she is standing her rear end may be raised by putting sufficient material on the

floor and forcing her to stand on it with her hind feet; or, when there is a platform with a drop or drain back of the cow, she may be reversed in the stall and the front feet placed in the gutter and the hind feet on the platform. When the animal is in the recumbent position I use every device I can think of, and am willing to use considerable time in trying to get her into the standing position, for if that can be accomplished and she can be raised by the hind quarters a large part of the work is done, as the pressure on the abdomen as well as the forcing of the internal organs backward make the work doubly hard when the animal is lying down.

One of the simplest methods—and this is used most advantageously when the uterus is wrapped or bandaged—is to have a clean cloth or sack placed underneath the uterus and the whole raised by two assistants so that there is no downward pull by the weight of the organ. The uterus can then be pressed in from the sides by using the fists, and the bandages can be gradually unwrapped as the uterus is fed into the vulva. This method is often useful even when no bandages are used.

Another method is to apply the fist to the most dependent part of the uterus and push the fist slowly upward through the mass until it enters the vulva; then, by gradually pushing forward during the interval when the cow is not straining, the uterus rolls up on the arm somewhat in a manner resembling a telescoping process. It is often surprising how easily reduction can be accomplished in this way, especially if one is endowed with a long arm; but on many occasions we lack a certain length in order to replace the uterus completely, and if we attempt to withdraw the fist to place it in a different position the straining of the cow will cause the uterus to follow, and in this particular this method can be improved.

By using a somewhat pear-shaped block of wood securely fastened to an iron rod, the whole to be several inches longer than the arm, we have a useful instrument to employ in these cases. The ball of wood should be somewhat larger than a fist and be perfectly smooth and rounded on top and fastened on the iron rod, which should be provided with a sort of concave grip or handle. By applying this instrument to the most dependent part of the uterus, in the same manner as if the fist were being used, and pushing it carefully into the vulva, pressure forward will carry the uterus into a position that can scarcely be reached with the hand. The additional length of this instrument is handy in assisting in proper reposition in the abdominal cavity and in taking out the folds in the uterus. While my experience in using this instrument has been

rather limited, there does not appear to be any more danger of brusing or rupturing the uterus than there does from using the knuckles. Dr. Brady of the Conestoga Veterinary Club has been using it for quite some time and claims good results.

Last, but not least useful, of the several methods to be referred to is that of raising the hind quarters of the cow by a block and tackle. This is usually a method of last resort and can as a rule be used successfully when all others fail. If it were not for the trouble of raising the cow it would be a practicable procedure in all cases of eversion in which there is a great deal of congestion and swelling. As in the other methods, the uterus is raised on a cloth and gradually pushed back into place.

Proper reposition and retention are so closely associated that they may be referred to at the same time. If reposition is careful and complete, retention in nearly all cases is easy. Diligent effort should be made to remove every little kink and fold and to push the point of the horn as far forward as possible, being careful that the point is left not in the least turned back. The inside of the uterus may also be swabbed with a soft sponge moistened with a warm, mild antiseptic solution. During the time these manipulations are in progress the uterus contracts considerably, and final steps for its retention can be proceeded with.

While it may not always be necessary, without exception I resort to suturing. Two or three sutures are placed in the lips of the vulva and the X or cross-sutures are placed in the skin, the uppermost at the point of the ischium and the other somewhat lower down.

One other point that I believe is of utmost importance and which is always carried out before leaving the case is to put plenty of straw or other material under the hind quarters of the cow so that she inclines downward and forward to a decided degree. This is left in position for some days or until there is no further danger of the uterus being again everted. If these steps are taken in proper reposition and retention the need for using a pessary or truss is very exceptional.

We frequently see inquiries relative to replacing the everted uterus of the ewe. This operation can be carried out very easily by having an assistant grasp the wool of the back in the lumbo-sacral region and raise the hind feet from the ground. By so doing the internal organs fall forward and straining is almost eliminated because the feet can not be fixed to the ground.

OPEN JOINTS

I had no intention of making this a paper on obstetrics, and as my subject allows an unlimited scope I wish to refer to a condition of which I have recently had quite a series, namely, open joints. In the treatment of open joints one man's guess is about as good as another's, so I feel free to make my guess even though it almost completely ignores antisepsis.

While open joints are encountered at a number of locations, two of the most common sites of occurrence at this season where horses are sharp-shod are the tarsal and the humero-radio-ulnar articulations. When called early on these cases before infection occurs, and if the opening is not too large, a blister will occasionally cause sufficient swelling to check the synovial discharge. In practice, however, we are seldom called early enough to follow that line of treatment.

When the opening is quite large and the discharge profuse I resort to fomentations with hot water, then have the part carefully rubbed dry. When there is much swelling, astringent lotions, lightly rubbed until quite dry, are useful. On the wound itself an antiseptic powder (boric acid has been most satisfactory to me) is pressed well into the opening and left as a thick layer over the wound. The boric acid can be applied quite frequently between bathings with hot water. Probing and injections into the wound are deferred as long as possible and are then used only in cases where infection is quite general.

If the foregoing treatment, even in cases that seem to show very slight improvement, is persisted in for some time the discharge usually diminishes and finally ceases. While there is as a rule considerable thickening and induration of the tissues by this time, I am always willing to take a chance on their gradual reduction rather than with a continuous discharge. With me the primary object is to cause the wound to seal just as early as possible.

Only in cases where infection becomes general throughout the bursæ are injections employed, while any one of a number of antiseptics may be used, such as Dakin's solution, the mercurial or coal-tar antiseptics, etc. Probably the most useful is iodine and ether. In injecting the solution the syringe is introduced only a short distance and upon its withdrawal a finger is placed over the opening to prevent the immediate back flow of the fluid.

Absolute rest is necessary, and when possible a large, roomy box-stall is provided, especially in cases where the hock joint is affected. The bedding should be of short material such as cut straw,

shavings or hay blossoms, and be kept clean and dry. In the course of some days the animal usually lies down a good deal, and he should not be disturbed even for treatment until he rises voluntarily. In many instances it is difficult for the patient to get up, and when found in the act of rising he may be given some assistance. In a box-stall he will have much better opportunity to help himself and use the injured member as little as possible. While horses in which the hock is the seat of injury will often lie down, those in which the elbow joint is affected will seldom do so unless completely tired out from standing. In either case the sling will be of advantage in resting the horse and will many times prevent a great deal of decubitus.

I think it is safe as a rule to regard those cases as hopeless—and this is especially true in involvement of the elbow joint—in which after continuous treatment there is increased discharge in which the synovia and pus are mixed with a sero-sanguinous exudate and where the tissues around the joint become hard and fibrous. In nearly all cases where there is considerable blood mixed with the exudate, not necessarily in the beginning but rather late, it is reasonably safe to expect serious injury to the bone or cartilaginous structure of the joint. In numerous instances in which postmortem examinations were carried out the bone was found badly damaged and in some cases necrotic.

A CORRECTION

In the article entitled "Field Observations in the Control of Abortion Disease," by George M. Potter, in the May number of the JOURNAL, the statement on page 153, second paragraph, should have read as follows: "Coöperative work of this kind was conducted in 20 counties pretty evenly distributed over the State" (instead of "6 counties").

How long will a cow live is answered in part by Old Grannie, a Scotch cow of the Aberdeen-Angus breed. She was the first cow in the herd book and lived to be nearly 36 years old and dropped 25 calves in Scotland.—*Wallaces' Farmer.*

MEAT INSPECTION AND ITS VALUE AS A SAFEGUARD TO THE PUBLIC HEALTH[1]

By R. W. Tuck, *New Orleans, La.*

MEAT inspection performs many functions, but chief of all is protection of public health.

In the early Biblical days the ancients recognized the need of some control of the meat supply. This duty was delegated at that time to the religious bodies. While today matters of church government and sanitation may be looked upon as separate and distinct functions, a close study of the early Jewish Church laws show us that the physical as well as the spiritual welfare of the community was considered in framing those early Levitical laws.

As we pass down the historical cycle from ancient Biblical times through various ages, we are frequently reminded of the necessity of inspecting meats. The early Egyptians were forbidden to eat pork, probably due to the tapeworm. Later the Athenians, and afterwards the Romans and the followers of Mohammed had similar laws. Our own early colonists recognized the necessity of some restrictions, and various city and State laws have existed for many years, indicating the necessity of meat inspection to protect the health of the meat-consuming public.

It may be well to review briefly the training necessary to make one competent to supervise the meat trade so as to give the greatest protection to human health against the numerous dangers that attend the use of unwholesome meats as food.

First and foremost, the matter of a general basic education is of supreme importance. It has been with great satisfaction that I have noticed the requirement of the preliminary education of a veterinarian mounting higher and higher, and while a full high-school course should be the least we will accept, a partial college course before entering a veterinary college should be our aim. This need will be evident shortly after entering the service, but will be more keenly felt a little later, when the inspector comes more closely in contact with the work.

If one is to rise above the plane of a mere cog in the ordinary routine of inspection he must have a broad understanding of human nature, so that many of the annoyances to which an inspector is

[1] Paper presented at the fifth-sixth annual meeting of the American Veterinary Medical Association, New Orleans, La., November, 1919.

subjected can be handled with discretion and cool judgment, instilling confidence, reducing friction to a minimum, and resulting in the work being carried on without appeals to higher authority, or the need of coercive measures. He is thrown in contact with people of learning, and called upon to make quick decision on matters requiring wide knowledge, where a limited education places him at a disadvantage and the work of inspection is discredited.

The veterinary education should be thorough, embracing all branches, and not confined to specializing on meat inspection. For instance, in a law suit in which I was witness, a person stated that the cows were so hungry when they were released from the cars that they began eating the fences, a statement that I hardly think he would have made had he been conversant with the anatomy of the teeth of cattle.

The lack of proper instruction in all lines of veterinary science will be apparent in antemortem and postmortem work, inspection of meat products or sanitation.

In antemortem work an inspector must be able to diagnose disease in live animals and in postmortem to recognize lesions of disease in the carcasses. The diseases he may encounter on the killing floor and in the pens are varied and numerous, in fact, embrace almost the entire category of the diseases affecting domestic animals.

A thorough knowledge of anatomy, including comparative veterinary anatomy, is imperative, so that the bones, muscles, viscera, etc., of animals may be readily recognized and fraud may be detected when meat or organs of various animals are substituted one for another; also any departure from normal, whereby one is able to recognize lesions of disease. The matter of sex and age is also determined by these means.

Pathology must be studied in all its phases, so the inspector may know just how to judge the flesh of animals affected with disease in its various stages.

Physiology has its importance, as by it we are able to indicate certain conditions which may render meat unfit for food, as immaturity, pregnancy, etc.

The life history and identification of various animal parasites requires close study, as meat infested with them may become a menace to health or dangerous to human life.

Bacteriology plays a great part in the work of the meat inspector, teaching him of the dangers that lurk in meat from animals infected with contagious or infectious diseases. Training along these lines

can not be too thorough. Again, bacteriology must be called upon to aid in judging meats that have been processed and later have deteriorated, as in cases of canned meats, cured hams, etc.

Chemistry is another study that can be used with great advantage in determining what is fit for food and what must be rejected. The theory of ptomaines and toxins calls for chemical experience. Then again, the analysis of fats, oils, spices, sausage, water, etc., are in these days matters of great importance to one intrusted with the inspection of meat and its products.

General sanitation and refrigeration must be given close attention, when one remembers how readily meats are liable to become contaminated or to deteriorate during the processes of slaughter and manufacturing.

General knowledge of packing-house construction and methods of operation, in so far as they pertain to the slaughter, curing and manufacture of meats and meat products, is imperative. While it is realized that such information can not be gained without coming into actual contact with these various institutions, that they most closely concern the lay inspector, and, it may be well to note, that in the ordinary course of promotion the veterinary inspector is not required to function fully in this line of work until after some years in the service, yet one can readily see that it is his duty, whenever opportunity offers, to be alive and gain all the knowledge of the subjects possible.

Having briefly reviewed the requirements to fit an inspector for this work, let us consider what he can accomplish by using his special training to protect the public health.

Scientific study has fully demonstrated that there are certain diseases of an infectious nature that occur in man as well as in domestic animals, as tuberculosis, rabies, charbon, etc., and at least some of these may be contracted by man eating the flesh of animals containing the virulent organisms that cause these diseases in the various animals.

It is one of the functions of meat inspection to see that animals about to be slaughtered are examined carefully for any physical signs of disease, and if such are found, the affected animal is properly marked for identification and slaughtered in such a manner that it can not contaminate other animals. At the time of slaughter special examination of all the glands, viscera, etc., is made, so that a thorough knowledge as to the extent, stage of the disease, etc., may be ascertained and a correct judgment as to the wholesomeness of the

flesh be made. But the functions of meat inspection do not stop here, for, after deciding the fit and the unfit, it proceeds to dispose of that which is unfit, including all parts infected with the disease-producing organisms, rendering them innocuous. If there are any portions of the animal that, after certain processes, as sterilizing, may be safely used for food, these operations are carefully supervised, so that any danger to human health is absolutely eliminated.

It is an established fact that there are certain animal parasites which during at least a portion of their life cycle reside in the flesh or organs of certain domestic animals, and when the flesh of such animals is used for human food they have in many cases resulted in injury to health or even in death. In this class may be mentioned trichinæ, immature in the muscles of swine; cysticerci in the muscles of swine and cattle; hydatids in the viscera of swine and cattle, and distoma, particularly in the lungs of swine. It is the function of meat inspection to locate these various parasites during the process of slaughter, by special examination of those particular organs or parts which science has demonstrated they prefer for their habitat, and to see that they are destroyed by refrigeration, cooking, etc., and in cases where the flesh itself has become unwholesome, to dispose of it properly.

There are certain animal or vegetable organisms that pass more or less of their existence in the body of domestic animals, which, while they may not be conveyed to man by eating the meat, cause conditions rendering unwholesome the flesh of the animals in which they exist. Some of these organisms, as those causing acute inflammation, pus, etc., produce tissue changes in the body of their host to such an extent that the flesh is directly injurious; others, as distoma invading the liver, etc., result in changes which cause the flesh to become unpalatable and of little or no food value. Meat inspection eliminates these sources of danger to human health on the killing floor.

Meat, particularly in its fresh state, forms a very fertile medium for the growth and development of organisms which, if taken into the human body, may result in sickness or even death. Unfortunately, these germs are very abundant and readily exist in the air, or upon the floor, walls, etc., of ordinary killing establishments, and particularly where sanitary laws are not enforced.

Meat inspection protects the health of the meat-consuming public, and also the employes engaged in slaughtering and preparing meats for food, by requiring that such plants be properly lighted and ven-

tilated. that they be provided with concrete or brick floors, and side walls of brick, cement or other material that will not absorb noxious matters and can be readily cleaned. A liberal supply of clean hot and cold water is required, so that all portions of the building can at all times be kept clean easily, thereby reducing chances of contamination; also for use in cleaning the carcass or parts during the various processes of slaughtering and preparation for food, and maintaining all utensils as well as the clothing of the men in a sanitary condition.

Inspection further protects the employes by properly disposing of animals or carcasses infected with diseases which might be conveyed to them during the process of slaughter, such as anthrax, etc., by requiring the employes to be clothed in a sanitary manner, also that they be provided with properly equipped quarters for dressing and toilet facilities, including laundry for clothes, shower baths, towels and heat when necessary.

As the flesh of various animals, and particularly those portions used for food, are very highly organized, it is particularly liable to decay. It is fully established that during the process of decomposition there are developed in the meat certain bodies or substances which, if taken into the human system, result in sickness or death. There are also other conditions that render the meat objectionable to the palate so that instead of a pleasing and satisfying food it is entirely unavailable for nourishment. In this instance the inspector guards against the organisms causing decomposition by requiring the slaughtering to take place under strictly sanitary conditions, and later the removal of the animal heat in such a way as to reduce the development of these germs to a minimum, and, after chilling it, that the low temperature is maintained until the meat reaches the consumer.

Aside from refrigeration other measures are taken to prevent decomposition of meat. Chief among these are curing, by the use of salt, sugar, wood smoke, etc., and heat as in cooking, sterilization, etc. While the proper application of any or all of these will obtain the desired result, their improper use may produce meat dangerous to health or unpalatable. Meat may become dangerous either by using too small an amount of salt or smoke, or too little heat, as in the process of canning. It may lose its nutritive value and become unpalatable by using too much salt, smoke, or even heat.

Owing to the fact that the spirit of covetousness occasionally develops in human nature, certain practices must be guarded against,

which, if allowed, would result in the consumer being defrauded. The practices referred to are such as substituting products of a lower grade for those of a higher; for instance, selling shoulders for hams, horse flesh for beef, veal for chicken, adding certain offal to pork and selling it as pork sausage, or suet to fat pork and calling it lard. These are classed as fraudulent, but one can see that if these practices were unrestricted they might become detrimental to health.

Meat inspection does not stop at protecting the public against unwholesome or inferior meat products, but it also acts as an agent against the waste of this valuable food. This is accomplished by notifying the manager of a plant if the meat is being neglected during the process of curing or storage. It is not infrequent that thousands of pounds of food are saved in this way.

The value of meat inspection as a safeguard to public health is in direct relation to its efficiency. To be efficient it must be effective, and it can not be effective unless it is so applied that it covers the whole field open for its usefulness. At the present time less than two-thirds of the meat slaughtered in this country receives even a cursory inspection, and not over 60 per cent is under competent inspection. Since all exported meats must be inspected, it goes to show that the 40 per cent of partly inspected or uninspected products are consumed in our own country. These conditions are the result of certain organic laws or are due to limitations of existing laws. For instance, we know that the Federal law relating to meat inspection, in so far as its limitations will allow, is carried out in an efficient manner and affords a great protection. Yet this law can not be applied outside of those limits to which the United States Constitution and Congress confine it, that of meats entering interstate or export trade.

For example, an animal is purchased for slaughter at one of the plants under Federal supervision, which requires that the animal receive competent antemortem and postmortem inspection. The dressed carcass leaves the place in first-class condition, bearing the official label. It is forwarded to a market where no inspection is provided, hung in a refrigerator poorly iced and reeking with filth. The meat is thereby contaminated by numerous organisms which render it unwholesome. Probably after being removed from the refrigerator it is hung in an unscreened shop where flies by the hundred come in contact with it, thereby counteracting most of the effort of the Federal inspection to safeguard the public health.

While this illustration applies to a considerable quantity of meat, it must not be taken as a reflection upon the effectiveness of the

Federal service from an operative standpoint, but it does show what defective limitations may result even where competency and honesty of purpose are carried out.

We as veterinarians have been intrusted with general supervision of the meat trade, and it is up to us, individually and collectively, to use our best endeavors in our respective locations to ascertain what protection human health is receiving against danger from an unwholesome meat supply. Where no laws exist, assist in getting them passed. Where laws exist but are not effective, find the cause, suggest the remedy, and give your whole-hearted support toward efficient enforcement.

In this connection it is my opinion that much of the present inefficiency and unpopularity of State and municipal meat inspection is due to a lack of uniformity in the inspection of meats. For instance, I have seen postmortem inspections that consisted of a glance at the carcass, after dressing, others consisting of a casual glance at the viscera, at time of removal; in other instances the inspection was confined to marking the dressed carcass. I have noted inspection of cured meats that was limited to counting the number of pieces or taking the count from an invoice, so that a charge could be made for the inspection.

It appears to me that a plan could be formulated whereby no matter how limited the inspection available it could be performed in a uniform manner. It could be required that in making a postmortem inspection it be imperative that certain glands and muscles be incised, and that special attention be given to those parts or organs of animal known to be the preferred seat of certain parasites or the most frequent location of lesions of disease. If an inspection of cured meats, such as hams and bacon, were provided for, it should include the use of a trier.

In order that meat inspection may become a more effective safeguard to public health I would suggest that the American Veterinary Medical Association, representing the veterinarians of this country, to whom custom has delegated the supervision of the meat trade, take definite steps to formulate, promulgate and enforce uniform methods of inspecting meats. This I believe would remove much of the unpopularity with which certain lines of meat inspection are now regarded and add to the financial success of the veterinary profession.

CLINICAL AND CASE REPORTS

REPORT ON AN OUTBREAK OF RABIES AT DOW CITY, IOWA[1]

By J. A. BRILL, *Dow City, Iowa.*

DURING the past spring and summer I encountered a rather extensive outbreak of rabies in my territory, which is situated in the southwestern portion of Crawford County, Iowa. The infection in question was brought into this territory by two coon dogs shipped from a point in Tennessee to a farmer residing two miles south of Dow City. Approximately a week after their arrival these dogs with a number of other dogs participated in a coon hunt. One of the Tennessee dogs while on this hunt developed vicious tendencies and bit one of the local dogs quite severely. The other Tennessee dog was apparently normal at this time. The dog which had become vicious was chained up but broke loose by slipping its collar and escaped, and no trace has ever been found of it. Shortly afterwards the dog which had apparently been normal developed symptoms of dumb rabies, which the owner called distemper and treated as such. Sufficient to say that the dog did not improve under this treatment and died. I did not have the opportunity of seeing either of these dogs, but by questioning the owner I had no doubt that these two dogs were the original spreaders of the rabies infection and that they were infected with rabies at the time of shipment from Tennessee.

On April 22, 1919, I received a call from 6 miles south of town from the owner of the dog which had been bitten 3 weeks previously by the Tennessee dog. He informed me that his dog had disappeared in the morning and the neighbors had told him that the dog had appeared as though mad and had attacked everything which crossed its path. The history and the symptoms exhibited by the dog were conclusive of rabies. The dog was killed and its head sent to the veterinary department of the college at Ames, where a positive diagnosis of rabies was made. During this fit of viciousness the dog had visited 14 or 15 farms and had traveled approximately 16 miles in an interval of several hours, attacking whatever crossed its path.

Immediate steps were taken to quarantine dogs in the infected area

[1] Presented at the thirty-second annual meeting of the Iowa Veterinary Association, Des Moines, Iowa, January 13-15, 1920.

and adjacent territory. I made a trip over the entire area covered by the dog and recommended the shooting of dogs which had been exposed and the muzzling and confinement of unexposed dogs. Furthermore, instructions were given to report suspicious actions of any animal. These recommendations were carried out in the majority of instances.

On May 12 a call was received from 12 miles south of town to a farm where the owners carried on the breeding of Russian wolfhounds, to see a dog which was acting strangely. The owners informed me that this dog had been bitten by the rabid dog on April 22, but because of its value they did not care to kill it unless it developed rabies. It showed pronounced symptoms of rabies and had torn its sheath and other parts into shreds with its own teeth. The dog was killed and the head shipped to Ames, where a diagnosis of rabies was made after a microscopical examination. I might add that in all cases where it was possible the head of the suspected animal was cut off and shipped for laboratory diagnosis. No other cases of rabies developed on this farm.

On May 16, while out in the same territory I stopped at a farm house for dinner. My attention was attracted by a 4-months-old pup which had been acting strangely. He seemed to be dull and listless; the lower jaw was paralyzed; considerable salivation was present; the eyeballs were turned outward, and the animal gave an occasional sharp bark followed by a series of unequal barks lower in pitch than normal. On being questioned the owner informed me that the dog had bitten his wife and sister-in-law 3 days previously and had shown a general vicious trend for several days. The pup was killed and the brain revealed the presence of Negri bodies. The two women were prophylactically treated against rabies by a local physician.

About 3 weeks later a barrow and three sows on this place showed the following symptoms: Extreme irritability, rooting the ground, and biting all objects within their reach. After such a period they would lie down apparently normal. There was considerable salivation present and loss of ability to swallow. The hogs would fall on their sides and squeal with an altered pitch of voice. These hogs were killed, but as it was very warm the heads underwent putrefaction before I was able to ship them. No more cases developed at this place.

On May 27 a stray dog which had developed rabies was killed 1 mile east of town.

On June 4 I was called to see a suckling calf, one of a herd of 5

cows and 6 calves just across the road from where the Russian wolfhound had previously developed rabies. The calf was continually bawling and had chased the owner out of the pasture several times. It was killed and the head sent to Ames, where a diagnosis or rabies was made. Doctor L. E. Willey informed me that this brain contained the largest number of Negri bodies he had ever been privileged to see. The remainder of the herd was treated as soon as I was able to procure rabies vaccine. Two calves died of rabies about 30 days after treatment.

On June 20 a client of mine brought in a pup about 2 months of age exhibiting clinical symptoms of rabies. The pup's mother had died 3 weeks perviously, exhibiting the same symptoms, and the owner informed me that she had killed all her pups except the one in question and had severely bitten it. The pup was killed and an examination of its brain showed the presence of Negri bodies. This pup had bitten one of the children on the hand, and this child received treatment against rabies. A calf, which was a sort of pet about the place and which had free access to the yards in which the dogs had been confined, died of rabies in the early part of August.

On July 25 I was called to a farm where I found 2 calves exhibiting characteristic symptoms of rabies. Laboratory examination showed rabies.

On July 28 a dog at Buck Grove, Iowa, 8 miles east of this farm, in a supposedly clean area, came down with rabies, but upon learning the history of the case I found that this dog had taken part in hunts with dogs which had been exposed.

I have omitted several cases as I did not care to burden you with an exhaustive report. The period of incubation has varied from 10 days to 5 months in these outbreaks, but allowances should be made for the possibility of an intermediate unrecognized exposure. The quarantine was in effect for 5 months and was kept very rigidly, most owners of dogs showing a disposition to prevent any further spread of rabies. I sincerely hope, however, that a law will be enacted which will give a police officer the power to kill all dogs in an exposed area. This would be beneficial in preventing the spread of this disease, once it gets into a community.

MELANOTIC SARCOMA AND SO-CALLED MELANOSIS

By SAMUEL HOWARD BURNETT, *Denver, Colo.*

A RECENT number of one of the veterinary periodicals of this country contains an article in which a veterinarian writes of another interesting case of "melanosis" in the horse. It would be interesting if it were truly a case of melanosis in the horse, although melanosis has no clinical significance. It is important, however, that it should not be mistaken for something that is of clinical importance.

Melanosis in the horse has been reported, so far as I know, but once. Goldberg[1] states that he has observed melanosis in black, brown and sorrel mares and geldings. Melanosis is not uncommon in calves and sheep. Melanotic sarcoma, or melanoma, is common in horses and is not uncommon in other kinds of animals.

Usually the neoplasms occur as rounded or nodular masses. Occasionally in the horse there is, besides the nodular growths, a diffuse growth spread out on the surface of the omentum, mesentery, pericardium or other serous surface. In the animals in which such a condition is found it is a development later than the rounded, restricted growths. It is the end condition and shows that the resistance of the animal has been overcome. A similar condition is seen in tuberculosis in cattle. So long as the animal's resistance is good the tuberculous foci are scattered, rounded nodules. When the animal's resistance is overcome a diffuse growth of tissue on the omentum or other serous surface may be found.

What would other members of the profession say of one who should call such a tuberculous lesion by the name of some harmless condition? Yet that is what has been done in the case of the most highly malignant of the tumors of the horse. Calling a case of melanotic sarcoma, where the neoplasms occur as rounded or nodular growths, "melanosis," shows that the author uses melanotic sarcoma and melanosis as synonyms. That was the case in the article referred to. It is incredible that a veterinarian should not recognize such growths as malignant tumors. It does not speak well for the state of advancement of professional knowledge that such a confussion of terms should continue to be made.

No real pathologist has ever confused the two conditions. Kitt's "General Pathology" is clear on the subject. Mention is made in

---

[1] Jour. Amer. Vet. Med. Assoc., vol. 51 (1919), p. 262.

Ziegler's "General Pathology" of a peculiar condition of melanosis in the internal organs of certain domesticated animals. If Ziegler had mentioned the animals (calves and sheep) in which the condition occurs, no one could have misunderstood what kind of a condition he had in mind. Anyone who knows a little veterinary pathology can not well misunderstand the meaning. It seems clear that when Ziegler mentions the deposit of black pigment in certain of the internal organs he does not mean the deposit in neoplastic growths.

Naming a malignant tumor by the color of the growth seems on the face of it absurd. It would be as sensible to call a case of chloroma chlorosis, though chlorosis is the name of an entirely different condition. Suppose there were such a thing as blue tumors. I have seen blue-green enlarged lymph glands and solid areas in the lungs of a cow. What would be said if blue tumors were called a case of cyanosis?

A good deal is being written and spoken about advancing the standing of the veterinary profession. Why not each of us apply a little advancement to himself? Care in using technical terms will help, I am sure.

NECROLOGY

Dr. C. H. Rike, of Indianapolis, Ind., died last December. Dr. Rike graduated from the Indiana Veterinary College in 1917. He was admitted to the A. V. M. A. in 1918, and was an inspector in the Bureau of Animal Industry.

Mrs. Young, wife of Dr. C. J. Young of Omaha, Nebr., died May 16, following a long illness.

ABSTRACTS

A Simple Method of Obtaining Permanent Cultures of Delicate Bacteria, and the Preservation of the Virulence of Animal Pathogenic Organisms. E. Ungermann. Arb. K. Gsndhtsamt., vol. 51 (1918), p. 180.

The possibility of preserving short-lived and delicate organisms for long periods is shown by the work of Neufeld on pneumococcus. (Kolle and Wassermann, Handbuch der Pathogenen Mikroörganismen, vol. 4, p. 524, 2 ed.) By this method, blood or organs from a mouse dead from pneumococcus sepsis are dried in a desiccator at room temperature, protected from light. This horny material, inclosing the organisms, is active from one-half to three-quarters of a year. When powdered, suspended in bouillon and injected into a mouse, fatal infection occurs. The pure culture obtained from the heart blood of such a mouse has the same virulence as the original culture used months previously.

Ungermann's method for the preservation of meningococcus: Rabbit serum obtained sterile, in test tubes, is heated 30 minutes at 60° C. under a layer of paraffin oil. Inoculate the serum, using sterile glass capillary pipettes. The serum may be diluted to 3 volumes, using sterile salt solution, although the undiluted serum seems to be preferred. Strains which lived 8 to 11 days on agar, serum-agar or blood-agar, aerobically at 37° C., when grown anaerobically in serum as described gave surface cultures on blood-agar plates 16 months after inoculation of the serum.

The biological properties of the meningococcus strains remain unchanged in these permanent cultures (Dauerkulturen). Their agglutination titer generally remains unaltered. Morphologically there are no changes, but there are slight alterations in staining reactions.

Gonococcus is as durable as meningococcus under the same cultural conditions. The growth of gonococcus in serum is decidedly advantageous for the preparation of vaccine, etc., particularly in view of the difficulty of growing the organism in the usual culture media.

Various strains of pneumococci grown in rabbit serum anaerobically at 37° C. as above described retained their viability 9 to 15 months (p. 193). The pneumococcus cultures form acid, precipitating some of the serum protein, but without inhibiting growth. Probably the proteins neutralize the acid, protecting the organisms from the acid somewhat as calcium carbonate does when added to some media.

Streptococci can be preserved a long time in the anaerobic serum, i. e., a year, without showing any change in vigor when sown on blood plates. Cultures of these same strains on blood-agar could be subcultured for only 5 to 7 weeks. After 5 months' preservation in serum culture two strains of streptococci showed no appreciable loss in virulence to mice inoculated with a bouillon subculture.

Highly virulent cholera vibrio and typhoid bacilli retained their virulence in anaerobic serum culture, especially if they were allowed first to grow and then the culture was preserved at refrigerator temperature about 4 to 6° C. W. N. BERG.

THE RELATION OF GAS GANGRENE OF MAN TO BLACKLEG OF ANIMALS. Steinbrück. Berl. Tierartzl. Wchnschr., 1918, p. 441. Abstract in Monatsh. Prakt. Tierheilk., May, 1919, p. 566.

From his knowledge of blackleg and his experiences with gas gangrene gained during the war, Steinbrück believes that the causative agent of human gas gangrene is not to be found in several distinct bacteria, but in a single organism which is the blackleg bacillus or at least one very similar to it. The experiences with blackleg vaccination showed further a new means of combating gas gangrene also with a vaccine. Conradi and Bieling sought an etiologic relationship of both diseases by comparing the causative agents in a human type (gas gangrene bacillus) and a bovine type (blackleg bacillus). Collectively studied strains of blackleg bacillus, gas gangrene bacillus, edema bacillus and *Bacillus phlegmonis emphysematosae* show two different forms according to their phase of development, a vegetative form on dextrose-agar and a spore form on bovine serum. The older the colony is the more spore forms it contains; the younger the more vegetative forms. The course of development of gas gangrene in man corresponds with blackleg (variety of the disease picture). With both, putrefaction develops with the increase of spore forms. Also the mode of natural infection is the same with both (deep wounds, infection with spore-containing earth, and simultaneously with aerobic wound infection germs). An infection through the oral mucous membrane takes place regularly in cattle, whereupon there develops the characteristic lesions of blackleg in the masticatory muscles and the edema formation in their neighborhood. The fact that for the most part cattle of an age from one-half to 4 years old sicken, Steinbrück traces back to the penetration of the anaerobe into the defective mucous membrane arising from shedding of the teeth. The same is true of foot-and-mouth

disease. In the beginning of gas gangrene and blackleg the body temperature is frequently normal. Fever does not always occur in the beginning as is asserted. Vaccination with "gas edema serum Höchst" has stood the test in the field. L. T. GILTNER.

EXPERIMENTS WITH QUARTZLIGHT TREATMENT IN SKIN DISEASES OF THE DOMESTIC ANIMALS. D. Wirth. Monatsh. Prakt. Tierheilk., May, 1919, p. 554.

The author summarize his experiments as follows:

With correct application quartzlight exerts a favorable action on the skin diseases of the domestic animals. Since the skin of animals (horse and dog) is less susceptible to the quartzlight than the skin of man, the intensity of the rays, i. e., distance and duration, must be greater with animals than with man. For the lightest treatment a distance of about 30 cm. and a duration of about 15 minutes is considered sufficient.

Favorable results were obtained in cases of acute and chronic eczema of both moist and dry character, in acne, and in suppurating *Trichophyton* infection. A case of dermatitis induced by drugs was favorably influenced.

Severe cases of acarus, acanthosis nigricans and seborrhea in the dog as well as mange in the horse were not influenced in a therapeutic sense by the quartzlight treatment.

This treatment is to be recommended in all cases in which it is desired to bring about a disappearance of connective tissue like thickenings of the skin caused by severe infiltation. It is particularly valuable in cases in which medicinal treatment has been of no avail. The combination of the quartzlight treatment with the external application of medicine has given favorable results. The marked hyperemia caused by the quartzlight aids in the absorption of the medicine.

The eyes of dogs showed no visible effect from the direct action of the treatment applied for several minutes.

Sarcoptic mange mites were killed after treatment with the light for 50 minutes. Dermatocoptic mites remained alive after a 2-hour treatment. L. T. GILTNER.

REVIEW

LES TUBERCULOSES ANIMALES (ANIMAL TUBERCULOSIS). By H. Vallée, Director of the Veterinary School at Alfort, and L. Panisset, Professor of the Veterinary School at Lyons. One-volume of 528 pages, with 8 colored plates. Octave Doin and Brothers, publishers, Paris, France. Price 14 francs.

Appearing as one of a collection of 25 volumes upon the subject of tuberculosis, which is being prepared by Chantemesse, Poncet and Collet, of France, is a most comprehensive and complete treatise upon the subject of tuberculosis among animals, prepared by Vallée and Panisset. In the production of this work the authors have made a thorough study of the writings of earlier investigators, and the bibliographic index which is included in their treatise is one of the many valuable features of the book. It is gratifying to note that the names and writings of American investigators are given a prominent place in the discussion of the various phases of animal tuberculosis. Extracts from the conclusions reached by such writers as Theobald Smith, Leonard Pearson, Park and Krumwiede, M. P. Ravenel, V. A. Moore, and several scientists engaged in research for the Bureau of Animal Industry, appear with pleasing frequency throughout the entire work.

Questions that have led to heated discussions in years past are treated fairly by the writers and at suitable length, but in no instance are they drawn out in tiresome detail.

The chapter on diagnosis is in itself a work of the greatest interest and value. In it the preparation, application and effectiveness of tuberculin, by the different methods of testing, are described fully and in an interesting and convincing manner.

The chapters on immunization and prophylaxis are of great practical value at the present time when such determined efforts are being made by stock owners to establish herds that are tuberculosis-free. No attempt is made to minimize the persistent effort that is necessary to eradicate tuberculosis from an infected herd, but where all modern means of fighting the diseases are faithfully utilized the prospects of finally gaining a healthy herd have not been more promising in many years. Considerable emphasis is justly placed upon the value of the education of stock owners. Convincing them of the danger that threatens where tuberculous animals are carelessly purchased and placed with sound stock, or in case tuberculous cattle or hogs are allowed to remain in herds that are otherwise healthy, is a positive step in advance toward reaching the desired goal.

H. J. W.

ARMY VETERINARY SERVICE

NEWS FROM THE SURGEON GENERAL'S OFFICE

THE following orders of transfer and reassignment have been issued for veterinary officers:

Major A. E. Donovan, U. S. A., from Chicago, Ill., to Camp Funston, Kan., as Division Veterinarian, 7th Division.

Major C. B. Perkins, U. S. A., from 2d Division, Camp Travis, Texas, to Remount Depot, Camp Travis, Texas, for duty.

Major J. R. Jefferis, U. S. A., from Remount Depot, Fort Keogh, Mont., to Boise Barracks, Idaho, for duty as Purchasing Zone Veterinarian.

Capt. G. W. Brower, V. C., from Chicago, Ill., to Camp Fort Bliss, Texas, as Camp Veterinarian.

Capt. W. C. Griffin, V. C., from Fort Bliss, Texas, to Chicago, Ill., for instruction in meat inspection.

Capt. P. M. Hudgins, V. C., from Camp Pike, Ark., to Boise, Idaho, for duty with Remount Purchasing Board.

Capt. C. C. Whitney, V. C., from Fort Sam Houston, Texas, to Washington, D. C., for duty with the Army Veterinary Laboratory at the Army Medical School.

Capt. J. A. McKinnon, V. C., who recently returned from acting as Chief Veterinarian, A. E. F., Siberia, to Camp Lewis, Wash., as Camp Veterinarian.

Capt. J. H. Drayer, V. C., from Fort Ethan Allen, Vt., to Remount Depot, Camp Dodge, Iowa, for duty as the Veterinarian.

Capt. H. Z. Homer, V. C., from Chicago, Ill., to Camp Grant, Ill., for duty with 6th Division.

Capt. V. B. Wright, V. C., from Chicago, Ill., to Camp Funston, Kan., for duty with the 7th Division.

Capt. C. Nockolds, V. C., from 7th Division, Camp Funston, Kan., to 2d Division, Camp Travis, for duty as Division Veterinarian.

THE ARMY REORGANIZATION BILL

THE Army Reorganization Bill, signed by the President June 4, 1920, has the following provisions of interest to veterinarians in its application to the Veterinary Corps:

"The number of officers with the Veterinary Corps shall be 175. * * * An officer of the Veterinary Corps shall be promoted to

the grade of First Lieutenant after three years' service, to the grade of Captain after seven years' service, to the grade of Major after fourteen years' service, to the grade of Lieutenant-Colonel after twenty years' service, and to the grade of Colonel after twenty-six years' service. * * * For purposes of promotion there shall be credited * * * to officers of the Veterinary Corps, their governmental veterinary service rendered prior to June 3, 1916."

"Filling of vacancy: Not less than one-half of the total number of vacancies caused by this Act, exclusive of those in the Medical Department * * * shall be filled by the appointment, to date from July 1, 1920, * * * of persons other than officers of the Regular Army who served as officers of the United States Army at any time between April 6, 1917, and the date of the passage of this Act. * * * No such person * * * shall be appointed * * * above the age of 58 years in a noncombatant branch. No such person below the age of 48 years shall be appointed in the grade of Colonel, or below the age of 45 years in the grade of Lieutenant-Colonel, or below the age of 36 years in the grade of Major. * * * Provided, that no officer shall be appointed in any branch of the service * * * except with the approval of the chief of such branch or officer acting as such."

"Promotion of officers: * * * Existing laws providing for the examination of officers for promotion are hereby repealed, except those relating to physical examination, which shall continue to be required for promotion to all grades below that of Brigadier-General, and except also those governing the examination of officers of the Medical, Dental, and Veterinary Corps. Officers of said three corps shall be examined in accordance with laws governing examination of officers of the Medical Corps, Second Lieutenants of the Veterinary Corps being subject to the same provisions as First Lieutenants."

"Appointment of officers: * * * Appointments * * * shall be made * * * in the Veterinary Corps in the grade of Second Lieutenant from reserve veterinary officers between the ages of 21 and 30 years."

"Officers' Reserve Corps: * * * Appointment in every case shall be for a period of 5 years. * * * The President may order reserve officers to active duty at any time and for any period; but except in time of a national emergency, expressly declared by Congress, no reserve officer shall be employed on active duty for more than 15 days in any calendar year without his own consent."

Provision is also made for the establishment of a Reserve Officers' Training Corps in civil educational institutions, to consist, in the case of such organization as the Veterinary Corps, of not less than 50 students. Veterinary students admitted to the Veterinary Corps unit for a course of training at the rate of 90 hours of instruction per annum for four collegiate years, if selected by the professor

of military science and tactics and the head of the institution at the end of two years of such training, on agreement to continue in the R. O. T C. for the remainder of his course and agreement to pursue the course in camp training, may be furnished by the United States with commutation not exceeding the cost of the garrison ration prescribed for the Army, for the remainder of his service in the R. O. T. C., not exceeding two years.

"The Secretary of War is hereby authorized, in his discretion, to detail not to exceed two per cent of the commissioned officers of the Regular Army in any fiscal year as students at such technical, professional, and other educational institutions, or as students, observers, or investigators at such industrial plants, hospitals, and other places, as shall be best suited to enable such officers to acquire a knowledge of or experience in the specialties in which it is deemed necessary that such officers shall perfect themselves. The number of officers so detailed shall, as far as practicable, be distributed proportionately among the various branches."

At the present time the Veterinary Corps has about half of its allotted quota of 175 veterinary officers, leaving about an equal number of vacancies to be filled. It is contemplated that 125 to 150 officers will be enrolled in the Reserve Corps. Provision is made to appoint veterinary officers from the reserve list, which includes only men who were in service during the war, in the various grades, the age limit which applies to the regular officers applying also in the case of these appointments. Such an appointment to any given grade automatically carries with it the number of years of service necessary for appointment to that grade as a basis for future promotions.

This bill marks a distinct improvement in the status of the veterinary officers as compared with the National Defense Act of June 3, 1916, which provided for 118 veterinary officers to rank from Second Lieutenant to the grade of Major after twenty years' service. While it can not be regarded as a final word in legislation for the Veterinary Corps, it is a substantial advance in status which should lead to distinctly increased efficiency and to a much more satisfactory environment for veterinary officers. Undoubtedly the veterinary profession will benefit by this recognition. M. C. H.

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Report of Committee on Necrology, 1918-1919

(Presented at the Fifty-sixth Annual Meeting of the Association, New Orleans, La., November 21, 1919)

THE information collected from several sources, namely, from the record cards of the Secretary's office, letters from the resident secretaries and secretaries of State and district associations, and from the veterinary journals, shows that not less than 145 veterinarians who were residents of the United States or of Canada have died during the year 1918-1919. The list of names is submitted herewith. Of this number 52 were reported as members of the American Veterinary Medical Association. A fuller investigation of the list by aid of the records of the Secretary's office will no doubt show that the names of many other members of the A. V. M. A. are included in the death roll.

All the information which it was possible to collect in the limited time has been sent to the office of the Secretary, for his use in checking up the records and as an aid toward securing fuller biographical data.

The incomplete supplementary list has been tabulated by States, and it is the desire of the committee that this list be looked over by one or more members from the different States, in attendance at this meeting, and that any missing data needed for the Secretary's records may be supplied.

The number and large percentage of deaths among the veterinary profession during the past year is probably unprecedented and is no doubt due in great measure to the influenza epidemic which prevailed during the latter part of 1918 and the early part of 1919. In the cases where the cause of death is given it is noticeable that "influenza and pneumonia" are mentioned most frequently.

The committee intended to give tabulations showing the losses sustained by the alumni of the several veterinary schools and the number who were connected with official work in the Federal Bureau of Animal Industry and in the State and Provincial service, as well as the number engaged in military service, but the information obtained was not sufficiently complete.

We regret that it is impossible to present a fitting biographical sketch herewith of the many deceased veterinarians whose services deserve more than a passing mention. Lack of time and space will not permit of this. Such biographical materials as we have been able to collect have been filed with the Secretary, and any important facts which have not already been printed in the journals will appear in future issues.

In such a large number of names it is to be expected that a few will stand out with somewhat greater prominence than others, and we are sure that it will not be regarded by anyone as an invidious distinction if we single out for special mention the names of two veterinarians, Samuel H. Ward of Minnesota and Major Harry D. Gill of New York, both of whom were members of the Association for many years and gave unstinted service for the advancement of the profession. A meed of praise is also due to Maximilian Herzog, a member of the medical profession who has done worthy work for the advancement of veterinary science. Nor should we overlook the passing of two laymen of distinguished attainments and service in the fields of education, statecraft and agriculture, whose large vision and powerful patronage have been of inestimable value to our profession, the Honorables Andrew Dickson White of New York and ex-Governor W. D. Hoard of Wisconsin.

If anyone present desires to supplement the report of the committee by a brief tribute to the men whose names have just been mentioned, or to any member of the Association who has passed away during the year, that privilege is accorded by the committee and we are sure will be granted by the Association.

J. W. CONNAWAY, *Chairman.*

ALPHABETICAL LIST OF DECEASED MEMBERS

(1 denotes Army service; 2, city or State service; 3, Bureau of Animal Industry.)

Bear, Harry H., Mountjoy, Pa.; Am. Vet. Col., 1893; A. V. M. A. 1913; died February 27, 1919.

Bird, Robert H., Greeley, Colo.; Royal Vet. Col., Edinburgh, Scotland; A. V. M. A. 1895; died October 26, 1919; age 65.

Burnham, Frank E. (2), Superior, Wis.; Chi. Vet. Col., 1890; A. V. M. A. 1899; died February 17, 1919; age 59; city veterinarian; deputy State veterinarian.

Brassard, George J., Ashland, Wis.; Ont. Vet. Col., 1895; A. V. M. A. 1910; died February 5, 1918.

Buchanan, Henry, Thomasville, Ont.; Detroit Col. Med., Vet. Dept., 1895; A. V. M. A. 1916; died 1919.

Campbell, William, Enosburg Falls, Vt.; U. S. Col. V. S. 1917; A. V. M. A. 1917; died October 21, 1918; age 36.

Carroll, 1st Lieut. Thomas B. (1, 2), Wilmington, N. C.; Univ. of Balt., 1891; A. V. M. A. 1908; died November 10, 1918; age 50.

Coppess, S. A., Waterville, Wash.; Ohio Vet. Col. (Cin.), 1892; A. V. M. A. 1916; died September, 1918, age 51.

Colson, Charles S. (3), Chicago, Ill.; McKillip Vet. Col., 1905; A. V. M. A. 1918; died July 2, 1919; age 40.

Debold, W. O. (3), Chicago, Ill.; Cin. Vet. Col., 1913; A. V. M. A. 1918; died August 10, 1919.

Fraser, Hunter (3), Tyler, Tex.; died October 16, 1918.

Gill, Major Harry D. (1, 2), New York, N. Y.; N. Y. Col. V. S., 1884; A. V. M. A. 1888; died October 3, 1918; age 57.

Gordon, C. C., Richmond, Ill.; McKillip Vet. Col., 1914; A. V. M. A. 1917; died March 8, 1918; age 26.

Greer, Henry A. (2), Danville, Ill.; Chi. Vet. Col., 1906; A. V. M. A. 1917; died December 27, 1918; age 38.

Hanson, Peter (2), Pullman, Wash.; S. F. Vet. Col., 1909; A. V. M. A. 1916; died December 19, 1918; age 35.

Heighway, J. G., Ladoga, Ind.; died February 18, 1919; age 55.

Herzog, Maximilian Joseph, M. D., Chicago, Ill.; Ohio Med., Cin.; honorary member A. V. M. A.; died August 9, 1918.

Hoard, Hon. W. D. (2), Fort Atkinson, Wis.; honorary member A. V. M. A., 1909; died November 21, 1919.

Johnson, Oscar J., Miles City, Mont.; Ohio St. Univ., 1911; A. V. M. A. 1913; died November 12, 1918; age 30.

Kendall, S. Paul, Wood River, Ill.; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 2, 1918; age 28.

Kraemer, Lieut. W. C. (1), Sunbury, Pa.; Univ. of Pa., 1916; A. V. M. A. 1916; died in France, 1919; age 28.

Lee, Jeptha D. (1), Menomonie, Wis.; Ont. Vet. Col., 1907; A. V. M. A. 1916; died March 1, 1919; age 41.

Lewis, James, Greenwood, Miss.; Chi. Vet. Col., 1903; A. V. M. A. 1909; died January 11, 1919.

Luzador, Roy A., Morrisonville, Ill.; Chi. Vet. Col., 1910; A. V. M. A. 1911; died October 21, 1918.

McCushing, Lieut. F. P. (1), Keene, N. H.; Univ. of Pa., 1907; A. V. M. A. 1908; died January 5, 1919; age 34.

Millard, Hugh R., Cheyenne, Wyo.; N. Y. State Vet. Col. (Cornell), 1911; A. V. M. A. 1912; died November 25, 1918; age 29.

Milligan, Stephen C. (3), East St. Louis, Ill.; McKillip Vet. Col., 1910; A. V. M. A. 1918; died September 26, 1918; age 36.

Misner, Lieut. Harvey C. (1), Terre Haute, Ind.; Terre Haute Vet. Col., 1912; A. V. M. A. 1918.

Morgan, William J., Seaton, Ill.; Chi. Vet. Col., 1906; A. V. M. A. 1912; died July 15, 1919.

Munsell, W. A., Green Cove Springs, Fla.; N. Y. State Vet. Col. (Cornell); died October 24, 1918.

Nattress, Joseph T., Delavan, Ill.; Ont. Vet. Col., 1885; A. V. M. A. 1904; died March 19, 1919.

Neal, Chester C., Glenolden, Pa., Univ. of Pa., 1916; A. V. M. A. 1918; died 1918.

Nichols, Walter S., Ravenna, Nebr.; Ont. Vet. Col., 1910; A. V. M. A. 1917; died October, 1918; age 36.

Orme, T. W., San Bernardino, Calif.; A. V. M. A. 1913.

Paley, Lieut. Israel (1), New York, N. Y.; Chi. Vet. Col., 1917; A. V. M. A. 1918; died October 16, 1918; age 28.

Palmer, Clinton B., Easton, Pa.; Chi. Vet. Col., 1911; A. V. M. A. 1913; died October 19, 1918; age 40.

Park, R. W., Dauphin, Manitoba; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 6, 1918.

Potts, 2d Lieut. F. E. (1), Sheboygan, Wis.; Grand Rapids Vet. Col., 1917; A. V. M. A. 1918; died 1919; age 27.

Rabin, Nathan W. (1), Pontiac, Ill.; Chi. Vet. Col., 1915; A. V. M. A. 1918; died November 3, 1918.

Reichmann, F. A., Geddes, S. Dak.; Chi. Vet. Col., 1910; A. V. M. A. 1912; died August 2, 1919.

Schopmeyer, 2d Lieut. A. C. (1), Poland, Ind.; Ind. Vet. Col. 1917; A. V. M. A. 1918.

Seright, William H. (3), Pleasanton, Kans.; K. C. Vet. Col.; A. V. M. A. 1917; died December 15, 1918; age 39.

Shaw, William G., Knoxville, Tenn.; Univ. of Pa., 1897; member A. V. M. A.; died April 23, 1919.

Stickel, William E., Etna Mills, Calif.; S. F. Vet. Col., 1913; A. V. M. A. 1915; died December 7, 1918.

Taylor, T. W., Macomb, Ill.; McKillip Vet. Col., 1917; A. V. M. A. 1917; died October 30, 1918; age 39.

Thompson, R. E. (2, 3), Tacoma, Wash.; Ohio St. Vet. Col., 1908; A. V. M. A. 1917; died April 14, 1918; age 34.

Treadway, Charles R., Canton, Mo.; K. C. Vet. Col., 1905; A. V. M. A. 1909.

Ward, S. H. (2), St. Paul, Minn.; Ont. Vet. Col., 1891; A. V. M. A. 1898; died December 13, 1918.

Wicks, A. G., Schenectady, N. Y.; Ont. Vet. Col., 1888; A. V. M. A. 1894; died March 9, 1919.

Wood, E. P., Charlottesville, Va.; U. S. Col. V. S., 1908; A. V. M. A. 1915; died December 22, 1918.

Wright, David E., Colfax, Colo.; N. Y. State Vet. Col. (Cornell), 1912; A. V. M. A. 1916; died March 28, 1919; age 27.

SUPPLEMENTARY LIST OF DECEASED VETERINARIANS

Alabama—D. A. Holmes, Dadeville.

Arkansas—Charles S. Aldrich, Forrest City.

California—H. E. Nelson, Laton; L. C. Kenyon, Merced; Ward B. Rowland, Pasadena.

Colorado—Fred W. Culver, Longmont; Thomas N. Slayton, Greeley.

Delaware—John W. Tigner, Dover.

Georgia—W. W. Parrish, Fitzgerald.

Illinois—Henry W. Asche, Manlius; Thomas H. Atherton, Yorkville; D. R. Benjamin, Leroy; J. D. Durack, Genesee; F. C. Grayson, Paxton; Volney G. Hunt, Arcola; A. L. Sederholm, Moline; Harry C. Whiteside, Eddyville.

Iowa—Dr. Breezley, Essex; Charles Blakely, Corydon; J. J. Carter, Bermond; William Ellery, Anderson; A. P. Jones, Martinsburg; Lester Jones, Sutherland; Lieut. E. R. Hites, Des Moines; Thomas Thompson, Rowan; G. E. Ureham, Atlantic.

Indiana—Nelson Stone, Huntington; L. E. Winn, Auburn; G. R. Wright, Cottage Grove.

Kansas—Phil. F. Simmons, Cottonwood Falls.

Maine—Fred W. Huntington, Portland.

Maryland—Michael Thomas Griffin, Jr., Baltimore.

Massachusetts—David DuBois Allen; Walter P. Mayo, Framingham; C. H. Perry, Worcester.

Michigan—Thomas Bell, Frontier; J. W. Hefferman, Pinckney; D. J. Lamoureux, East Lansing; Wallace McQueen, Oxford; Charles A. Waldron, Tecumseh (member State Board of Examiners).

Missouri—T. W. Churchill, St. Louis; William Cooper, Kansas City; J. R. Jerome, Mountain Grove; J. S. Martin, Monroe City; J. J. Pendergast, St. Louis (formerly city veterinarian).

Mississippi—George A. Love, Brookhaven.

Manitoba—Hubert D. Lawson, Newdale; Dr. Reid.

Nebraska—J. S. Vinnedge, Ord.

New York—W. W. Andrew; William F. Braested, Brooklyn; Saul S. Brooks; David W. Clark, Walton; Jonathan H. Conover; Hugh F. Davis, New York City; Edw. S. Doyle; George W. Gilbert, Bayport, L. I.; William P. Hannifen; W. W. Herron, Sherman; Max Hartvigson, New York City; W. J. Johnston, Geneva; John S. Lamkin; Lewis Sheridan Matthews, Cooperstown; Nathan Peyser, Corona, L. I.; Rudolph Plageman, Brooklyn; J. L. Rowan, Corning; Edw. C. Ross, New Haven, Conn.; Robert J. Twitty, Buffalo; George A. Waters, Brooklyn; F. H. Warner, New York City.

North Dakota—G. W. Reimche, Lincoln Valley.

Ohio—Edgar L. Burke, Worthington; William J. Classen, Cleveland; Ayriel Greenough, Cleveland; Lieut. Edw. J. Snyder; Ralph A. Wilcox, Xenia.

Pennsylvania—John C. Brackbill, Lancaster; P. L. McBreen, New Kensington; George Nichols, New Kensington; William H. Seitzinger, Wernersville; J. H. Timberman, Wilkes-Barre; Thomas M. Waldron, Uniontown.

South Dakota—B. B. Bassett, Gettysburg; C. S. Walkup, Pipestone.

Texas—W. A. Skinner, Fort Worth.

Washington—Leroy L. Shaw, Dayton; R. E. Thomson, Tacoma.

Wisconsin—Harry Snyder, Montfort; Charles Woodford, Portage.

Wyoming—H. R. Bernard, Upton.

Section on College Faculties and State Examining Boards

THE College Faculties and State Examining Boards Section of the American Veterinary Medical Association met in connection with the fifty-sixth annual meeting of the Association at New Orleans, La., November 20, 1919.

The meeting was called to order by President R. C. Moore. Owing to the fact that there were many things of importance to be brought before the general session, it was moved, seconded and carried that the papers of this division be read by title only and that they be submitted to the General Secretary of the Association for publication.

There being no report of committees, a motion was made to proceed with the election. Carried. Dr. Reuben Hilty was nominated for President and elected by unanimous ballot. Dr. H. S. Murphey was nominated for Secretary and elected by unanimous ballot.

President Moore made a short address urging the closer cooperation of the various State examining boards and college faculties with a view of establishing uniformity in examinations by the State boards and more uniform courses in the veterinary colleges. He also urged that faculty members and members of State examining boards interest themselves with a view of establishing this closer coöperation.

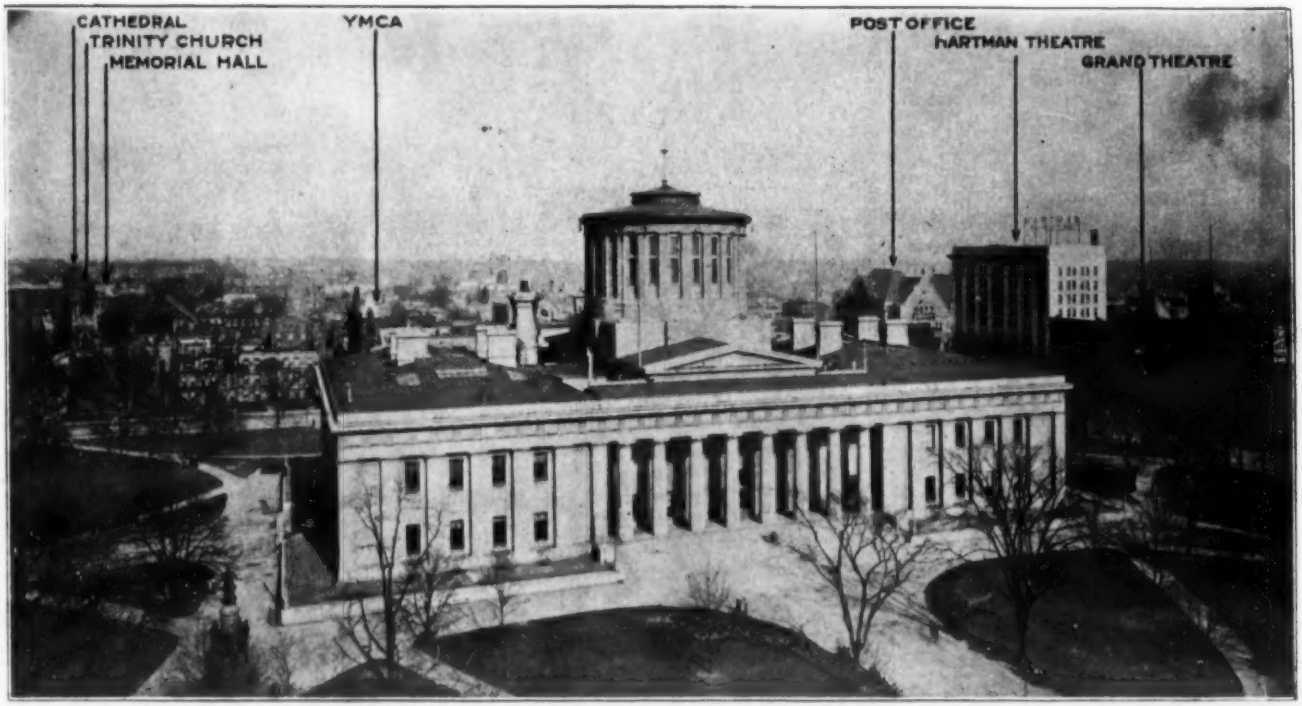
There being no further business, the meeting adjourned.

ROBT. D. WALL, *Secretary*.

Hurdling a drainage ditch with the assistance of Henry Ford, walking seven miles to town after the breakdown of a less popular car, being hauled out of a "gumbo" hole by a team of mules following a cloudburst, and sleeping all night on one's elbow in a day coach to keep to the schedule, were a few of the experiences which befell the editor during a recent trip through Arkansas, Texas and Oklahoma.

Drs. Hecker and Baker, who are conducting a large practice at Houston, Texas, report an ever-increasing demand for their services in the adjacent counties, particularly in connection with vaccination against hog cholera, anthrax and blackleg.

Dr. J. T. Dungan, of Cushing, Okla., is so fully occupied with his growing practice that he has not had time to give any consideration to the newly developed oil field almost in front of his hospital.



The above is a view from the roof of the Huntington Bank Building, Columbus, Ohio. This building is almost adjacent to the Hotel Deshler, the headquarters for the A. V. M. A. meeting August 23-27 inclusive. Memorial Hall, where the sessions and exhibits are to be held, shown to the left, is three squares out East Broad Street from the Hotel. The State House occupies the center of the view.

OTHER ASSOCIATIONS

ONTARIO VETERINARY COLLEGE GRADUATING EXERCISES

THE closing exercises of the graduating class of 1920 were held in the assembly hall of the Ontario Veterinary College on Thursday, April 29, 1920. Principal McGilvray occupied the chair, and the Hon. Manning W. Doherty addressed the graduating class, presented the diplomas and awarded the prizes. The other speakers were Malcolm McVicar, M. P. P.; Leslie W. Oke, M. P. P., and Dr. William Cowan. Among the visitors were Drs. Richmond, Ottewell, Buckley, Thompson, Dunn, Irvin and Mackie, and C. F. Bailey, managing director of the Royal Agricultural Winter Fair Association of Canada. There were also present the following members of the faculty: Drs. Addison, Batt, Nelson, Pringle, Campbell, Gwatkin and Weaver.

In his address Principal McGilvray expressed the hope that the graduating class would maintain high ideals and inculcate in their future work the knowledge and training acquired during their college course. While the increased use of motors had somewhat lessened horse traffic in the cities, there was nevertheless a great demand for good types of horses at good prices. Cattle, sheep and swine had likewise reached higher values than heretofore, which would likely continue for some time owing to the world shortage. The preservation and fostering of live-stock interests, therefore, became of national concern, as they constitute an important factor in the economic conditions, which can not be lightly sacrificed. Some skilled service must therefore be provided and maintained to safeguard the herds and flocks of the country against depletion from diseases, especially those which are preventable or of such a nature as may be communicable and endanger large numbers. The opportunity for rendering this service to the live-stock industry is open to the veterinary profession. To cope fully with the various demands the profession must maintain a high standard of efficiency in all its branches, and the benefit of preventive medicine should be advocated. Every veterinarian should endeavor to educate his clients on the various diseases of live stock which are preventable, and special emphasis should be placed on the value of preventive treatment against such diseases as blackleg and hemorrhagic septicemia of cattle, white scours of calves, and

joint ill of foals. More attention should be given to the control of tuberculosis, contagious abortion and sterility in cattle. Parasitic diseases, such as lung worms and stomach worms in sheep, can also be handled by the veterinarian with advantage to the owner. The losses from these maladies are undetermined, but they unquestionably reach an enormous aggregate sum which every one should endeavor to prevent or reduce as far as possible.

In concluding his address Dr. McGilvray referred to the great influence which the alumni of the College could wield for higher education and better standards of veterinary service. Additional encouragement was to be expected from the recent veterinary legislation, which the Honorable Manning W. Doherty and the other members of the Legislature had been instrumental in having enacted. Dr. McGilvray then introduced the graduating class to the Honorable Manning W. Doherty, the Minister of Agriculture for Ontario.

The Minister, in his address, stated that he had for many years taken a keen interest in the progress of veterinary science. Its problems also concerned him, as he was a breeder of live stock and fully realized the importance of skilled veterinary service for the treatment and prevention of animal diseases. The present occasion also gave him additional pleasure, as it brought back memories of his own student days at the Agricultural College. He extended to the faculty and students his best congratulations for the excellent showing of the various classes. He fully realized the enviable reputation enjoyed by the Ontario Veterinary College, and he exhorted each graduate to do everything in his power to carry on the good work and further raise the prestige and standard of the institution. It was not possible for any educational institution to give complete knowledge to its graduates, but the training received enabled them to increase further their knowledge and to make the best application of it in their life work. He appealed to the class to keep abreast of the times by reading the best veterinary and other scientific journals, and to contribute freely of their knowledge in order to get results and to bring added honors to their profession. The Department of Agriculture, over which he had the honor to preside, was deeply interested in the promotion and advancement of veterinary science in its relation to agriculture. The development of Canada was largely bound up in agriculture and our future would be influenced greatly by the further development of the live-stock industry. In fact, it was becoming more fully realized that live stock is the sheet anchor of successful agriculture, by main-

taining the fertility of the soil. This is well exemplified in the case of England, which, although the soil has been under cultivation for centuries, still retains its fertility through the raising of live stock. While every good breeder of live stock recognizes the importance of having trained veterinarians in the community, yet it was felt that, in some respects at least, they were not wielding the influence they should. This was partly due to the fact that too many of them had confined their energies to diseases of the horse and neglected to become equally conversant with diseases of cattle, sheep and swine, and had failed to become judges of live stock. If the veterinary surgeon wished to succeed and to command the confidence of live-stock owners and breeders, he must become a reliable judge of live stock and thus be recognized as a real force and factor in live-stock development. In alluding to the recent Veterinary Science Practice Act, which had been enacted by the Legislature, Mr. Doherty hoped that it would improve the status of the profession in Ontario. With this came added responsibilities, and it should be the aim of the colleges to educate and train students so that, when they graduate, they may more adequately perform the services and render the leadership which the community may expect from them.

In presenting the diplomas and prizes Mr. Doherty referred to the large number in the class that he noticed were wearing the Military Service Button, and said that he realized more and more that men should not be judged by the amount of wealth which they accumulated but by the sacrifices which they had made and were prepared to make for their fellow men and the community at large.

Those receiving diplomas were W. D. Baskette, Mount Elgin, Ont.; R. J. Bowerman, Weyburn, Sask.; W. J. Drennan, Alliston, Ont.; E. G. Folsom, Mount Clemens, Mich.; A. G. Frew, Scotland, Ont.; J. L. Gleason, Lakeside, Ont.; J. S. Glover, Carstairs, Alta.; L. B. Jakes, Toronto, Ont.; R. G. Law, Toronto, Ont.; H. G. McDonald, Antigonish, N. S.; J. E. Nesbitt, Merivale, Ont.; G. E. Stanley, Holland Center, Ont.; L. E. Turner, Mono Road, Ont.

The prizes were awarded as follows: J. S. Glover and G. E. Stanley (equal), first prize; A. G. Frew, second prize; R. G. Law, third prize; L. E. Turner, honorable mention.

Mr. Malcolm McVicar, member of the Legislative Assembly for the constituency of East Elgin, then addressed the class. Mr. McVicar expressed a sincere interest in the welfare of the veterinary profession, especially in view of the fact that veterinary science

could render valuable service to the live-stock industry, which was one of the basic principles of successful agriculture and an integral part of the economic fabric of national growth and prosperity. He counseled the class to remain steadfast, for, although at times they might meet with adversity and discouragement, they should maintain the right attitude towards their profession, have a broad outlook, and success would be their reward.

Mr. Leslie W. Oke, member of the Legislative Assembly for East Lambton, stated that this was his first visit to the College, and he hoped to have a further opportunity of becoming conversant with its progress and usefulness. He felt that, with the determination manifested in the faces of the various members of the class, they would make good and bring credit to themselves and their Alma Mater. He advised them to be faithful to their profession, to be honest and do justice to their fellow men, and to overcome obstacles by renewed application and perseverance.

Dr. William Cowan of Galt, Ontario, who was on the Board of Examiners during the late Dr. Andrew Smith's time, next addressed the meeting. In the course of his remarks Dr. Cowan alluded to the origin of the College, through the influence of the late Honorable Adam Ferguson, one of the pioneers of agriculture in the Province of Ontario, and traced its growth and progress up to the present time. It was due to the efforts of Mr. Ferguson that Dr. Andrew Smith had been able to establish the Ontario Veterinary College. Dr. Cowan himself had long been closely identified with the profession in Ontario, and knew its problems. For forty years legislation for the regulation of veterinary practice had been a vexed question. It had been sought for from all shades of political parties, but it remained for what is popularly known as the "Farmers' Government" to place on the statutes more satisfactory veterinary legislation. He was, therefore, more hopeful than ever as to the future of the profession, and had no fears but that they would merit the confidence and recognition accorded.

Mr. George E. Stanley then presented to the College a mounted photograph of the graduation class. In making the presentation he stated that all of the class, with the exception of two members, had seen active service overseas during the late war, and had served in the front-line trenches with some of the best fighting units of Canada. On behalf of the class he extended to the principal and faculty their appreciation for much helpfulness and encouragement with their studies, and stated that they wished to record themselves

as being satisfied with the course of studies and training received at the College.

In responding, Dr. McGilvray expressed his appreciation of the kindly sentiments tendered the College by the different speakers and wished the graduating class of 1920 "Godspeed" and extended his sincerest hopes that their prosperity would continue throughout the future.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

THE regular monthly meeting of the Veterinary Medical Association of New York City was called to order in the lecture room of Carnegie Laboratory, 338 East 26th Street, Wednesday, May 5, at 8:30 p. m. The minutes of the April meeting were read and approved.

Prof. John F. DeVine, Goshen, N. Y., gave an interesting talk on "Balanced Rations." The Professor handled this important subject in his well-known style, and while not posing as an authority on the scientific feeding of dairy cattle, he gave some valuable information on the care, feeding and management of the purebred dairy cow. He stated that in his opinion the feeding and management counted fully 50 per cent in the production of a world's record cow. What he considered a good balanced ration consisted of 200 pounds wheat bran, 200 pounds hominy or corn meal, 200 pounds crushed oats, 100 pounds cottonseed meal, 100 pounds linseed meal, 1 per cent salt, with plenty of roughage, clover hay, roots, alfalfa and silage. That his talk was immensely appreciated by all those in attendance was evidenced by the active discussion and questions asked by a majority of the members.

Prof. Wilfred C. Lellman, M.D., D.V.S., New York City, presented a very able lecture dealing with his studies on animal psychology. He supplemented this with drawings of the central nervous system illustrating his theories. Owing to the lateness of the hour the Professor was unable to finish his lecture, but he promised to be present at the June meeting to resume it and to answer any questions that the members might wish to ask. The secretary was requested to write Dr. Blair, requesting him to be present at the June meeting if possible, in order to discuss Professor Lellman's lecture.

Dr. William J. McKinney, chairman of the Prosecuting Committee, reported that he had investigated the case of Miss Susanna Bell,

who was alleged to be practicing illegally. In his opinion no action should be taken. It was moved and seconded that Dr. McKinney's report be accepted and placed on file.

A vote of thanks was extended to Professor DeVine and Professor Lellman.

Meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary.*

HUDSON VALLEY VETERINARY MEDICAL ASSOCIATION

The Hudson Valley Veterinary Medical Association held a well attended meeting at Newburgh, New York, May 12. The discussion was confined to hog cholera and allied diseases and the preventive inoculation by use of anti-hog cholera serum and virus.

Dr. B. J. Cady, Federal inspector in charge of the coöperative hog cholera educational work in New York, and located at Ithaca, gave a very excellent talk and demonstration on the use of serum and virus from the practitioner's standpoint, explaining every detail of the technique and also the pitfalls met with in practice in diagnosing various forms of hog diseases.

Dr. A. Eichhorn, now Director of Lederle Serum Laboratories at Pearl River, New York, discussed immunization methods and cleared up some important points which were extremely interesting from an economic standpoint for veterinarians with mixed practices.

Dr. J. G. Wills, Chief Veterinarian of the New York State Department of Agriculture, spoke upon the rules and regulations relating to the reporting of outbreaks and handling virulent blood to be used for immunization.

The demonstration by Dr. Cady was conducted on two hogs at Dr. J. W. Fink's Veterinary Hospital Laboratories, where he showed a simple method of handling and securing animals for inoculation.

J. W. FINK.

At the fifty-seventh annual commencement of the Kansas State Agricultural College, held May 27, the degree of Doctor of Veterinary Medicine was conferred upon the following: E. S. Bacon, E. M. Berroth, R. F. Coffey, J. F. Erdley, S. Eriksen, H. B. Hickman, R. W. Hixson, S. R. Johnson, L. A. Magrath, I. T. Mock, W. J. Ritter, M. P. Schlaegel, G. M. Simpson, L. V. Skidmore, J. E. Stanton, B. L. Taylor, B. B. White.

MISCELLANEOUS

IMPORTANT NOTICE

Secretary Mayo has written this office as follows:

"I am inclosing with this letter a list of 530 members of the A. V. M. A. who have not paid their dues for the current year. It is my understanding that their copies of the JOURNAL should be stopped. Three notices have been sent to all of them."

This means that one out of every eight members of our Association is delinquent, which to say the least is rather surprising. We feel that most of the delinquents have mislaid or neglected the notices of the Secretary, but under the regulations of the Post Office Department this will be the last number of the JOURNAL mailed them unless we are notified by the Secretary that their dues have been paid. Much extra and unnecessary work falls upon the Secretary because of the failure of members to acknowledge the first or at least second call for dues, and the expense to the Association of reinstating a delinquent is equivalent to that of installing a new member. If you are in doubt as to your present standing, Secretary Mayo will be glad to furnish you the information upon request. If the JOURNAL ceases to arrive at your office, remember "there's a reason."

NEW VETERINARY BARN AT THE UNIVERSITY OF MINNESOTA

A REAL hospital for veterinary clinical experiments and the care of farm live stock was recently finished and occupied at University Farm, Minn. Dr. C. P. Fitch, chief of the division of veterinary medicine of the University of Minnesota, says the new barn "has no equal in the United States, with no chance for an argument."

Owing to the rising costs, the new barn cost several thousand dollars more than was provided in the original appropriation by the legislature. It is 150 by 38 feet, with a vitrified clay block silo at the south end. There is a central driveway through the barn, with doors at each end and in the center at each side. All the doors are vestibuled, the better to maintain a uniform temperature for the animal patients within. The walls are constructed of hollow clay blocks and are 12 inches thick. On the outside the walls have two coats of Portland cement and a coat of stucco. The lower half

New veterinary barn, University Farm, Minn.

Interior view of Minnesota veterinary barn

of the walls inside are of white enameled tiling, while the upper half is plastered with Portland cement. Tiling facilitates cleaning and its use is held to be justified economically.

Ample sunlight for sick stock is admitted by 11 windows on either side of the building. Ventilation is provided by 11 intakes on either side, located between the windows near the ceiling, and four staggered outtakes arranged alternately one on either side of the central driveway.

Hudson barn equipment is used. There are 12 separate calf pens and 22 stanchions, 11 on either side in the south half of the barn. The calf pens are separated by concrete partitions and each pen has an individual drain or else connects directly with a drain in the alley. The floors are concrete throughout, with corked brick in the stanchions.

The ceiling is especially well insulated with tar paper and lath, flax keyboard linum, and a heavy coat of Portland cement on the surface. The hay chute is in the center of the barn and is insulated from the lower part by a long trough which fits flush with its edges and serves as a conveyance for the hay when lowered. The grain is kept in four bins in the loft, two on either side in the form of a double bin. These double bins connect with a single feed chute, one on each side of the drive. The barn is supplied with hot and cold water and electric lights.

THE PROFESSION HONORED

AT the recent commencement of Iowa State College of Agriculture and Mechanic Arts at Ames, Iowa, June 9, the honorary degree of Doctor of Science was conferred upon our Editor. The degree was conferred by President Raymond A. Pearson in the following words:

"John Robbins Mohler, graduate of the University of Pennsylvania, Chief of the Bureau of Animal Industry, United States Department of Agriculture, scientist, investigator, administrator, eminent veterinarian, director of the work of more than five thousand Government employes, leader in the eradication of animal diseases;

"By virtue of authority vested in me, and upon the unanimous recommendation of the Faculty of this College and with approval by the State Board of Education, I confer upon you the degree Doctor of Science, with all the rights and privileges thereto appertaining, here and elsewhere."

It will be recalled that Dr. Marion Dorset, Chief of the Biochemic Division of the Bureau of Animal Industry, received the honorary degree of Doctor of Veterinary Medicine from the same institution in 1915, in recognition of his research work on animal diseases, especially in connection with hog cholera. C. H. S.